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The University of Massachusetts

REPORT OF THE PRESIDENT

to the Board of Trustees, the Governor, and Citizens
of the Commonwealth

JANUARY, 1950 TO JANUARY, 1951



February 6, 1951

The Honorable Joseph W. Bartlett
Chairman, Board of Trustees
The University of Massachusetts

Sir:

I have the honor to present through you to the Board of Trustees for transmission to the Governor of the Commonwealth the annual report of the University of Massachusetts for the year ending January 1, 1951.

Respectfully submitted,

RALPH A. VAN METER, *President*

VOLUME XLIII

JANUARY 1951

NUMBER 1

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Report of the President

At the present moment the University faces a period of more than usual uncertainty growing out of the defense emergency. Fortunately we are at the end of a period in which much has been done that will increase our usefulness in meeting whatever demands are placed upon us.

The past year is our fifth since the end of the war. Like each of these years it has been marked by several developments that have greatly improved our organization and effectiveness as an educational institution. We were able to admit 847 freshman students—an increase of one third over the record entering class of the previous year. Our extensive work in agriculture and horticulture has been reorganized and consolidated under a Dean of Agriculture. Our new programs in engineering and forestry have been fully accredited by the appropriate professional agencies. Two sub-departments in the School of Liberal Arts have been given departmental status. We have made noteworthy changes in our Graduate School and in our admissions procedures, have reorganized our student health services, and have started to move into Civil Defense work as our first contribution to the preparedness program.

In addition, the past year has seen the completion of an electrical engineering building and a student-faculty apartment building. The new power plant and the animal pathology laboratory are nearing completion. Two much-needed buildings were authorized—a \$600,000 dining hall, and an \$800,000 dormitory that will be constructed by the Alumni Building Corporation.

The peak of the veterans bulge passed out of the University last June with the graduation of the largest class in our history. The admission of 847 freshmen in September reflected not only the replacing of student veterans by non-veterans, but marked a step ahead in bringing our four undergraduate classes back into balance and in opening new educational opportunities to boys and girls of the Commonwealth who have reached college age since the war years.

The larger freshman class has made possible the first post-war increase in enrollment of women—an increase of one fourth. This brought the total of women undergraduates from 635 to 787. Many hundreds of young women with fine records as students and under compulsion to find low-cost educational opportunities have been unable to enter a University crowded to the limit with veterans. We hope to provide soon for further growth in the number of women students.

Next September we plan to admit 1000 freshman students, of which 400 will be women. This entering class would bring the total enrollment to about 3900. In the present uncertainty, however, the effect of expansion in our military forces cannot be forecast with any accuracy until the new draft law is passed by Congress.

For this year, the Dean of the University reported an enrollment of 2776 four-year undergraduates in the fall semester. The Graduate School and the two-year Stockbridge School of Agriculture brought the total enrollment to 3524. In addition, the University provides about a dozen short courses annually for approximately 200 adult students who come to the campus for periods ranging from five days to three months.

The veterans are passing rapidly out of the colleges. A total of 848 were registered in the fall semester in all parts of the University. Only 31 veterans were enrolled in the freshman class. Several bills are before Congress to extend educational benefits to veterans of the Korean and succeeding campaigns, and it is highly probable that problems connected with the education of veterans will be with us for a long time. The important results seem certain to be that, again, unexpected educational opportunities will be opened to a new generation, and another step will be taken toward the removal of financial barriers to higher education.

The developing mobilization effort has not yet taken many of our students, although a feeling of uncertainty is widespread among them. As one step to meet the problem of manpower and the college student we are once more offering an accelerated program to students who wish to graduate in three years. That is, we are resuming a two-term or 12-week summer session in order that summer students may get almost a full semester of course work. A freshman class also

will be admitted in June, and we plan to provide a summer Reserve Officers Training Corps program in connection with the Armored Cavalry and Air Force units on our campus.

Sixty-eight members of the professional staff are reserve officers and three have been called to active duty. It is certain that others will be taken and that still others will leave for critical positions in government and defense work as we move to mobilize further the resources of the nation. This is as it should be. But we hope we can get all our staff back when we need them. Temporary suspension of programs in higher education may once again throw an overwhelming burden on the colleges, and a fully effective teaching, research and administrative organization requires long years of development.

LIBERAL ARTS AND SCIENCES

In my last two annual reports I have discussed the problem of bringing together our separate schools of liberal arts and sciences into a central college of arts and sciences, and the related problem of our need for a dean to handle the administrative work. The heart of a University organization is such a college. It is here that all students go for the first two years of general education before either proceeding to the professional schools or electing to stay in arts and sciences for general or professional education.

As was pointed out in my report of last year, both our School of Liberal Arts and our School of Science have been long established and are well developed. Each is headed by a teacher who is carrying a full teaching schedule. The combined enrollment of 1300 is larger than that of many liberal arts colleges. Both schools have completely outgrown their administrative organizations. A satisfactory degree of curriculum and budget supervision is not possible under these conditions.

Two years ago the Board of Trustees directed us to bring these schools together into a central college of arts and sciences around which the professional schools, such as agriculture and engineering, could be organized. We hope this year to get authorization for a dean of this college. Eighteen departments make up these schools, and only a full-time administrator could supervise them. This is a key position.

The increase in the enrollment of women students seems certain to result in a relative increase in student majors in the departments of the schools of liberal arts and science. The one position of dean that would make possible the merger of these schools into our central college would greatly strengthen our entire University organization.

The School of Liberal Arts, in addition to serving the entire undergraduate student body in the first two years of our core curriculum, has more students than any comparable part of the University—a total of 734 in the autumn semester. Of these students, 337 were women.

The rapid post-war increase in student enrollment in this part of the University has resulted in a degree of crowding that is a handicap to the work. One department, for example, goes to nine buildings to meet classes. A classroom building to bring this work together and to relieve the pressure on many other buildings is becoming one of our major needs.

More adequate quarters for the department of Fine Arts are also needed. Music cannot reasonably be housed in a classroom building demanding quiet surroundings. For several years the music program has functioned only by courtesy of the Alumni Association, and at the expense of student extra-curricular activities which center in the alumni-built Memorial Building.

In this post-war period there has been a general strengthening of several liberal arts departments, such as History and Government, English, Economics, Psychology and Education. One new development has been the addition of a teacher in audio-visual aids to teaching. An audio-visual center has been set up to assist the faculty in using films, records and lantern slides, and a good start has been made in this work. Another new development of the post-war period has been the return of journalism to the curriculum. Within the past three years 14 of our students have gone into newspaper work.

The growing maturity of our liberal arts school was indicated this past year by the selection of one of our English teachers as national executive secretary of the College English Association and editor of its monthly magazine. In addition, two sub-departments in the School of Liberal Arts, Sociology

and Philosophy, were given departmental status. This should facilitate their further development.

With 600 undergraduate students, the School of Science ranks second in enrollment among our schools. Its eight departments have been strong since the early days of the Massachusetts Agricultural College. Some of the departments have strengthened their staffs materially during the year. Several substantial grants of funds for research have been made available. Spirit and morale throughout the School of Science are high.

The Connecticut Valley offers rare opportunities for field work in geology and the biological sciences. An unsurpassed outdoor laboratory surrounds the campus. Few institutions in the country have such a varied terrain at hand, or such a wide range of natural surroundings for geologic studies.

Some of our science courses form the basis for important programs in public health. A course in clinical laboratory methods has been offered for some years. With minor revisions it is being offered this semester in cooperation with the State Department of Public Health to train auxiliary medical laboratory personnel for civilian defense work in blood typing, Rh determinations, differential cell counts and other techniques related to blood handling and transfusion. This is a pilot course which will be used as the basis for courses at other institutions in the Commonwealth.

We have arranged for three new 12-week courses in Environmental Sanitation for health department inspectors. These will be taught largely by the staff of the New England Field Training Center of the United States Public Health Service, now located on the campus. Enrollment is limited to 15 for each course—12 from city and town health departments in Massachusetts, and three from other New England states. These courses seem to meet a real need, and the demand for them is quite active.

The University has the basic courses in arts and sciences that could be used for a five-year School of Nursing. There is an important need for such a school in connection with both the national defense effort and the increasing number of women students at the University. Two years ago the Dean of the University began a study of the problems of a nursing

program, and he has reported that a full program could readily be provided by the University.

We already have the courses needed for the first two years. The next two years would be spent by the students in clinical instruction at nearby hospitals which are anxious to cooperate. A final year would be spent on the campus in advanced courses, all of which we have or can easily provide. We would need to add to our staff two or three new members to direct the training and to teach courses not now in the curriculum. The program would open new opportunities to women students, and would meet the need for professional nurses trained in supervisory work.

EDUCATION OF WOMEN

The rapid increase in number of women students brings new prominence to the problems of education for women. Women students, like the men, follow their interests into almost every part of the University after they have completed the first two years of general education. We believe that neither women nor men should all be pressed into the same educational mold.

Many women students stay in the School of Liberal Arts for four years of a general education, or preparing for professions such as teaching. Women students are found in almost every professional field at the University. But although they follow the same required curricula as men, the elective courses available each semester may be selected with different objectives in mind, and the over-all program may be quite different from that of any man.

We have but one professional school, Home Economics, that is given over almost entirely to the education of women. Even here men are often found in such courses as Advanced Nutrition—men whose primary interests are in related fields. Enrollment in Home Economics is growing rapidly. Last year there were 177 majors in the School. This year there are 241. There is every indication that rapid growth will continue.

This growth is a result in part of fine facilities and courses. In part it is a result of increasing interest in careers for women. Home Economics has a primary concern with homemaking. However, it opens career opportunities in many other fields

where trained workers are in demand, such as foods and nutrition, child development, textiles, clothing, and applied art.

A woman's adult life is usually divided into three parts, careerwise. From college she goes to a position in which she can support herself until marriage. The early married years are devoted to homemaking, but when the children are grown up and gone she can often arrange for a career outside the home if she has the interest and knowledge needed for a start. Home Economics offers fields of interest that may be prominent through all these changes in objectives with hardly a break; that is, Home Economics education can be highly relevant to a woman in all three parts of her adult life.

Home Economics is only one of many approaches to careers of accomplishment outside the home, but some attention should be given to domestic affairs in the education of women. It is obvious that no more important responsibility will ever be found for most women than the management of homes and the raising of the next generation, and that too often this responsibility is left to information picked up incidentally along the way.

Better children from better homes might well become a national slogan. The armed forces find it necessary to reject more than 20 per cent of our young men as physically or mentally unfit. These handicaps are often as crippling in civilian as in military life. Proper attention in early years would have prevented the development of many of them.

Even more important, perhaps, is the development of mental slants that lead to anti-social behavior. Juvenile delinquency is a serious problem everywhere. The greatest tragedy is not that some of these children may later have to be placed in institutions for the good of society, although many will be, but that millions of law-abiding citizens live their lives so far below par, handicapped by maladjustments of personality that could have been prevented in early years by a better general knowledge on the part of parents of the problems of child development and by the better environment of a home where the wealth of information now available is used intelligently.

AGRICULTURE AND HORTICULTURE

In my report of last year I mentioned the need of bringing all our well-developed resources in agriculture and horti-

culture to a focus in one excellent professional school. On November 1 this was done with the appointment of Dr. Dale H. Sieling as Dean of the combined Schools of Agriculture and Horticulture. This brought together under his direction, all agricultural and horticultural teaching, research, extension and control services. This will give a unity and coordination to the program which have been needed.

We have 406 four-year undergraduates in the new School of Agriculture and Horticulture, 440 students in the Stockbridge School, and 69 graduate students in agriculture and horticulture—a total of 915 students. This is more students of agriculture than we had when the institution was a College of Agriculture. We have more and, I believe, better courses than we had at that time.

The University is the only institution of higher education in the Commonwealth which has a comprehensive program of service to agriculture in teaching, research and extension. The reorganization of the past year should make possible a better coordination of our program and its maintenance on a high level, entirely suitable to the leading agricultural state in New England.

The Stockbridge School of Agriculture continues to serve with a two-year non-collegiate course those students who cannot for one reason or another take four years of college work. This school is 30 years old. Its graduates have made fine records. They manage, for themselves or others, some of the best farms of New England, and they fit into industries related to farming wherever a practical knowledge of modern farm operations is required. The positions of responsibility attained by many Stockbridge men and women are ample proof of the value of this two-year program to the students and to agriculture.

Off-campus teaching and related educational services are a well-developed part of the work of the School of Agriculture and Horticulture. More farm families than ever before are calling on Extension workers for help in learning about and in using better methods of farming and homemaking. More than 116,000 persons attended Extension meetings in the past year.

Research has been a vital part of our agricultural services for more than 60 years. During the post-war period the

scientists of the Massachusetts Agricultural Experiment Station have made several outstanding contributions. For example, a new method of preventing infectious bronchitis in laying flocks is estimated to be saving poultrymen of the Northeast from three to six million dollars annually. A better method of weeding carrots by chemical means that was developed here is now being applied to 90 percent of the nation's carrot fields, and is estimated to be saving six million dollars annually in hand labor. In connection with this work, Professor William H. Lachman was given a national award in 1948 for the best research on vegetable crops.

Other research developments include a method for determining heat inactivation of enzyme systems in acid canned foods. It is expected to save many millions of dollars annually by preventing food spoilage and deterioration. A new strain of White Plymouth Rocks is today being received with great enthusiasm by New England poultrymen.

The effect of organic matter in soils on phosphate availability and utilization is a fundamental discovery which should contribute substantially to the preservation of our dwindling supply of natural phosphate fertilizers. Every improvement in agriculture from research or extension or teaching results in the end in better or cheaper food for consumers.

During the past year the department of forestry in the School of Agriculture and Horticulture was accredited. Forestry courses have been offered for many years, but it was not until the post-war period that a complete curriculum was established. The department is one of 25 schools or departments that have accreditation by the Society of American Foresters.

PROGRESS OF NEWER SCHOOLS

The School of Engineering is now in its fourth year, and has an enrollment of 379 students. In the past year the programs in electrical, mechanical and industrial engineering were inspected and accredited by the Engineers' Council for Professional Development. Our older civil engineering curriculum was accredited last year. Accrediting committees are concerned not only with the professional courses, but with supporting courses and the general education program of the institution. Accreditation so soon after the organization

of the School is a tribute to the staff in engineering and in related fields as well.

In October we moved into the new electrical engineering building which gives us modern laboratories and adequate space for this program. The electrical engineering building has been planned as a wing of the main engineering building that should be constructed when the present defense emergency is over. This building will provide laboratories for dynamics, soil mechanics, sanitary engineering, and other phases of our program. It will also provide room for an engineering library, a campus broadcasting studio, two drafting rooms, four classrooms, and offices for engineering teachers now housed temporarily in other buildings.

The establishment of an Engineering Research Institute was authorized in the past year. One project is under way and others are planned for the coming year. Each member of the staff will be expected to devote some time to research and development work, and the Institute is now ready to offer effective research services to the smaller industries of Massachusetts.

The School of Business Administration has 319 major students, of whom 100 are freshmen. This school has developed an effective staff and curriculum, and student interest indicates that the school will continue to be prominent in our organization. One book was published by a member of the staff during the past year, and the book of another staff member will be published within a few weeks. A flow of journal articles is further proof of an alert staff interested in productive scholarship.

The industries of the region form a natural field laboratory for the staff and students in Business Administration. Studies made by them are already proving to be highly useful in guiding industrial developments. The Pioneer Valley Association provides a cooperative field organization supported by leading business men in the region. Two publications which reported the results of such studies during the year were a substantial bulletin on the Pioneer Valley Industrial Survey, and another on population growth in Pioneer Valley. The School has provided extension classes for foremen and others in business and industrial management. It plans to continue

to assist interested firms, especially those industries which are expanding rapidly because of the present emergency.

THE GRADUATE SCHOOL

Fred J. Sievers retired as Director of the Graduate School on November 1 after 20 years of effective service. At the first Commencement under his directorship, 18 advanced degrees were conferred. At the Commencement exercises of last June, 106 advanced degrees were conferred, 19 of them to foreign students.

During the coming year seven new programs will be offered by the Graduate School. A master of arts program will be offered in English, History, Mathematics and Philosophy. In addition, a master of science degree will be offered in civil, electrical, and mechanical engineering. The Graduate School should continue to grow in response to the increasing demand for advanced work in almost every field of learning. It is increasingly evident that the rapid growth of specialized knowledge has made it impossible to develop in four college years professional people of the degree of competence needed. We are handicapped on every hand by men and women who lack the final educational capstone of graduate work.

A good graduate organization in a department is a natural corollary to an active research program, or a program in some kind of creative scholarship. Together they furnish a stimulus to the staff and to undergraduate students that can be obtained in no other way. Our Graduate School is in process of reorganization with a view to extending its work gradually to every strong and interested department.

UNIVERSITY EXTENSION

In cooperation with the Massachusetts Division of University Extension a series of courses for college credit has been started at Westover Air Base. All requirements for a degree with the exception of a final year of study in residence on the campus may be met by taking these courses. Laboratory courses will be taken in campus laboratories in the evening. Admissions are handled by the regular admissions office of the University.

Seven courses were conducted in the first semester with

204 men enrolled. The most serious handicap is the unavoidable absence of students from classes, because of increasing military activity. It is not yet clear whether or not this venture can be successful in a period of mobilization, but we plan to continue the courses through the second semester.

An opportunity has been extended to engineers at Pittsfield to complete requirements for degrees through University Extension courses. Some courses involving laboratory work will be taken at the Campus. Eighty-one men were enrolled in these courses in the first semester. This promises to develop into an extension center in Pittsfield of considerable importance.

ADMINISTRATIVE DEVELOPMENTS

Prior to the admission of our present freshmen class it was the policy of the University to delay final acceptance of all applicants until May. In the fall of 1949 we adopted the policy of accepting applicants early in the senior year of high school if their qualifications fully satisfy our requirements. Applicants who are not fully certified for entrance by the high school principal are, as before, asked to take the College Entrance Examination Board Scholastic Aptitude Test. Achievement Tests also are required if there is still some doubt as to whether the candidate can carry a college program successfully.

This succession of checks and tests of doubtful students may seem excessive but they are a protection both to the University and to the student. To be dropped from college for scholastic failure is profoundly disturbing to most young men and women, and they should not be subjected lightly to that experience. Also, students who are prepared to do the work are the first step toward standards of high academic achievement in the classroom.

When he has gained admission every freshman student needs the friendship and personal interest of at least one or two adults with whom he is in frequent contact. These friendships develop naturally with years in college but the freshman, who needs the help most, tends to feel lost in a strange environment.

The break between high school and college is sharp and positive. Suddenly the student must think through and make

for himself a multitude of decisions that yesterday were made or influenced strongly by parents or guardians. He must organize his time to insure careful preparation for each class. It is now his own responsibility to eat regularly and well. He must even put himself to bed when the time comes and get up promptly for breakfast and that early class. He must provide a satisfactory program of recreation. He must direct his own participation in the life of the campus. He must develop his religious interests. For the first time he must organize his life for himself.

Aside from the suddenness of the break, all this is good. The freshman has arrived at an age when he should develop an independence and self-reliance which are often difficult to achieve at home. The abrupt nature of the transition, however, calls for the help of someone, warm of heart and wise of mind, who can be a guide, counsellor and friend.

This can be provided through an advisory system with the help of interested and sympathetic teachers. This year we have had the assistance of 46 members of the faculty who act as freshman advisers. Their much-appreciated service has been effective. Along with the proctors and heads of residence in the dormitories, these teachers have the satisfaction of helping to smooth the way for many students who might have fallen behind in a college program that calls for achievement from the very start.

All student health and safety services were reorganized last April and placed under a University Health and Safety Council with the Dean of Men in charge. In May new regulations were made governing all eating establishments connected with the University.

The Committee on Student Life, working with the Health and Safety Council, has issued a comprehensive statement relative to the fire-proofing of materials used for decorations. It has also secured the services of a competent man to fire-proof certain widely-used materials. Frequent inspections are being continued to make and to keep fraternity and sorority houses as safe as such gathering places can be made.

THE WAY AHEAD

This is probably the last nearly normal academic year that we shall see for some time. Increasingly we must turn

our attention to defense. As a State University we feel a special obligation to place all our resources at the disposal of defense administrators. Some staff members are already spending much of their time on defense measures at regional, state and national levels, and we are prepared to cooperate fully at any point where we can help.

The nation may be approaching a situation where our first concern will be sheer physical survival. Granted that, we can concern ourselves with victory for the principles and ideals for which we stand. Only after survival and victory are assured can we turn our interest toward "business as usual" or the maintenance of our standard of living.

It is equally true that our customary way of life should be changed only for well-considered reasons. We can stop Communist aggression with force. Communism itself is an idea, however, and ideas are not killed by atomic bombs. Only a better idea can defeat Communism in the minds of the have-not peoples of the world. We are certain that we have a better idea, and that it will win easily if it is given time to demonstrate its effectiveness in those countries where people live primitive lives in the midst of great natural resources.

Our real superiority is not in automobiles and refrigerators and radios. They are only the result of something much more significant, and that is our dedication to a system of government that makes a high standard of living possible by freeing the individual and opening the way for the highest achievement of which he is capable. We must not forsake our democratic ideal. We must continue to demonstrate its superiority at home.

In education we must keep our schools intact and moving forward, and we must keep in mind that far-off goal of education for every individual to the limit of his capacity. Under freedom that is the key to rapid national advancement.

With the support of this Board of Trustees we shall try to adjust to the changing situation as effectively as possible. We look forward, with you, to a future that may be trying and at times confused, but that will be always exciting in its opportunities for help to the state and nation to which the University owes its very existence.

RALPH A. VAN METER
President

February 6, 1951

UNIVERSITY OF MASSACHUSETTS ENROLLMENT

October 1950

UNDERGRADUATE COLLEGE

Class.....	1951		1952		1953		1954		Total		
SCHOOL	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
Liberal Arts	113	52	93	63	100	77	91	145	397	337	734
Science	109	21	99	29	111	45	134	52	453	147	600
Agriculture and Horticulture	96	7	98	4	75	11	110	8	379	30	409
Engineering	133	0	100	0	69	0	77	0	379	0	379
Business											
Administration	69	3	69	3	71	4	103	4	312	14	326
Home Economics	0	32	0	47	0	63	0	99	0	241	241
Division of Physical Education	19	0	5	0	12	0	24	0	60	0	60
Specials									9	18	27
TOTALS	539	115	464	146	438	200	539	308	1989	787	2776

GRADUATE SCHOOL

Men	Women	Total
284	26	310

STOCKBRIDGE SCHOOL

Class.....	1951		1952		
	Men	Women	Men	Women	Total
	195	4	233	6	438

SUMMARY (October 1950)

Undergraduate College.....	2776
Graduate School.....	310
Stockbridge School.....	438

3524 Total Enrollment

(Office of Publications, October 1950)

ota
73
60
40
37
33
24
6
2
77

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36

THE UNIVERSITY OF MASSACHUSETTS

BULLETIN



Annual Undergraduate Catalogue

UNDERGRADUATE
SCHOOLS ~ 1951-52



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LEWIS AND THATCHER DORMITORIES FOR WOMEN

Bulletin

UNIVERSITY
of
MASSACHUSETTS

CATALOGUE OF THE UNIVERSITY

1951-1952



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FOREWORD

This Catalogue of the University presents announcements concerning courses, admission, etc., for the sessions of 1951-52.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.



The University Catalogue for the sessions 1951-52 is part of the Eighty-Seventh Annual Report of the University of Massachusetts and as such is part II of Public Document 31. (Sec. 8, Chapter 75, of the General Laws of Massachusetts.)

UNIVERSITY OF MASSACHUSETTS

UNDERGRADUATE CALENDAR

1951

February 5, Monday, 8:00 A.M. Second Semester begins.

February 22, Thursday. Washington's Birthday. No University Exercises.

March 31, Saturday, 12:00 M. to April 9, Monday, 8:00 A.M. Spring Recess.

April 19, Thursday. Patriot's Day. No University Exercises.

May 19, Saturday, 12:00 M. Classes stop.

May 21, Monday to May 29, Tuesday, 5:00 P.M. Final Examinations.

May 30, Wednesday. Memorial Day. No University Exercises.

June 1, Friday to June 3, Sunday. Commencement.

June 18, Monday to July 28. First 6 weeks, Summer Session.

July 30, Monday to Sept 8. Second 6 weeks, Summer Session.

1951-1952

September 17-19, Monday through Wednesday. Freshman Orientation.

September 17, Monday. Registration of Freshman and Senior Students.

September 18, Tuesday. Registration of Sophomore and Junior Students.

September 19, Wednesday. Classes begin for all but Freshmen.

September 20, Thursday, 8:00 A.M. Freshman Classes begin.

September 20, Thursday, 10:45 A.M. First University Convocation.

October 12, Friday. Columbus Day. No University Exercises.

November 12, Monday. Observance of Armistice Day. No University Exercises.

November 21, Wednesday, 12:00 M. to November 26, Monday, 8:00 A.M. Thanksgiving Recess.

December 15, Saturday, 12:00 M. to January 3, 1952, Thursday, 8:00 A.M. Christmas Recess.

January 3, Thursday, 8:00 A.M. Classes Resume.

January 17, Thursday, 5:00 P.M. Classes stop.

January 18, Friday. Registration of Freshman and Senior Students.

January 19, Saturday. Registration of Sophomore and Junior Students.

January 21, Monday to January 30, Wednesday, 5:00 P.M. Final Examinations.

January 30, Wednesday, 5:00 P.M. First Semester Ends.

February 4, Monday, 8:00 A.M. Second Semester Begins.

February 22, Friday. Washington's Birthday. No University Exercises.

April 5, Saturday, 12:00 M. to April 14, Monday, 8:00 A.M. Spring Recess.

April 19, Saturday. Patriot's Day. No University Exercises.

May 17, Saturday 12:00 M. Classes stop.

May 19, Monday to May 29, Thursday, 5:00 P.M. Final Examinations.

May 30, Friday to June 1, Sunday. Commencement.

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ant Professor, Research.* Shade Tree Laboratory
- MALCOLM ARTHUR MCKENZIE, PH.B., A.M., PH.D. (Brown University),
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Heads of those departments functioning in the Experiment Station, although not listed here, are also recognized as members of the staff.

REGULATORY SERVICE STAFF

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West Experiment Station

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Paige Laboratory

JOSEPH BART, B.S. (University of Massachusetts), *Instructor, Research,
Feeds and Fertilizers.*

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CARL DAVID BRANDT, B.S. (University of Connecticut), *Instructor, Research,
Poultry Disease.*

Paige Laboratory

Paige Laboratory

MIRIAM KEITH CLARKE, A.B. (Mt. Holyoke College), M.S. (University of
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WILLIAM KENNETH HARRIS, D.V.M. (Ohio State University), *Professor,
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HENRY ALFRED PECK, B.A. (University of Connecticut), *Instructor, Re-
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Paige Laboratory

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ROBERT THOMAS WETHERBEE, B.S. (University of Massachusetts), *Assistant Professor, Research, Feeds and Fertilizers.*

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- WILLIAM ARTHUR FITZPATRICK, B.S. (University of Massachusetts) *Research Fellow in Wildlife Management.* Conservation Building
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- DONALD PEARSON ALLAN, B.A. (University of Massachusetts), *Associate Extension Professor, Secretary of Extension Service.* South College
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- ELLSWORTH WILLIAM BELL, B.S. (Pennsylvania State College), M.S. (University of Vermont), *Extension Professor of Agricultural Economics.* Stockbridge Hall
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- BYRON EARLE COLBY, B.S. (University of New Hampshire), *Extension Professor of Animal Husbandry.* Stockbridge Hall
- FREDERICK EUGENE COLE, B.S. (University of Massachusetts), *Extension Professor of Fruit and Vegetable Marketing.* Stockbridge Hall
- VERDA MAE DALE, B.S. (Kansas State College), M.S. (Cornell University), *Associate Extension Professor of Home Economics.* Edna Skinner Hall
- RALPH WILFRED DONALDSON, B.A. (Acadia University), B.S.A. (Toronto University), *Extension Professor of Agronomy.* Stockbridge Hall
- MAY ESTELLA FOLEY, B.S. (Michigan State College), M.A. (Columbia University), *Extension Professor of Home Economics.* Edna Skinner Hall

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- WILBUR HERMAN THIES, B.S., M.S. (Michigan State College), *Extension Professor of Horticulture*. French Hall
- CECIL LYMAN THOMSON, B.S.A. (University of Toronto), M.S. (University of Minnesota), *Extension Professor of Vegetable Crops*. French Hall

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Stockbridge Hall

ELLSWORTH HAINES WHEELER, B.S. (University of Massachusetts), M.S., PH.D. (Cornell University), *Extension Professor of Entomology.*
Fernald Hall

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ELEANOR JANE GATES, B.S. (University of Vermont), *Assistant Club Agent.*

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BERT TOMLINSON, *County Agent-Manager.*

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ALLAN*, E. E. ANDERSON, LANPHEAR, O. C. ROBERTS*, SNOEYENBOS, STANNE*.

CALENDAR COORDINATING

Chairman CURTIS, DICKINSON, HOPKINS, MCGUIRK, PIERPONT, VALLANCE.

CAMPUS PLANNING

Chairman OTTO, BLUNDELL, BREHM, BURKE, CURTIS, HENDRICKSON, MARKUSON, MCGUIRK, J. ROBERTSON, W. H. ROSS, TROY.

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Chairman RITCHIE, ALVIANI, BREHM, R. R. BROWN, BURKE, CURTIS, EMERY, HOPKINS, W. G. O'DONNELL, L. R. WILSON.

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Chairman MACHMER, CADIGAN, R. C. FOLEY, GAMBLE, GOLDBERG, KAUFFMAN, KEYSER, H. S. MITCHELL, NEET, PURVIS, RITCHIE, TRIPPENSEE, WOODSIDE.

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* Alumni representative

Elected faculty members:

Term expires 1951: ALDERMAN, KIMBALL, NEET, STAPLETON, TRIPPENSEE.

Term expires 1952: COOK, TOTMAN, A. M. SIEVERS, JEFFREY.

Term expires 1953: CARY, ROYS, L. R. WILSON.

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Chairman WESTCOTT, BILLINGS, BUNN, W. G. COLBY, COX, R. C. FOLEY, FRENCH, HOLDSWORTH, JEFFREY, LOY, H. S. MITCHELL, RICE, SHAW, SNYDER, C. L. THAYER, TIMBERLAKE, WERTZ.

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Chairman WOODSIDE, BENNETT, ESSELEN, FRAKER, HANSON, JEFFREY, MARSTON, MCGUIRK, MORRIS, PURVIS, RAND, SIELING, WERTZ, L. R. WILSON.

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Chairman HOPKINS, CURTIS, HANKINSON, RADCLIFFE (*ex officio*), RANDOLPH, A. A. ROBERTSON.

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VISUAL EDUCATION

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* Alumni representative

UNIVERSITY OF MASSACHUSETTS

The University of Massachusetts is the State Institution of the Commonwealth founded under the provisions of the Morrill Land Grant Act of Congress of 1862. This Act provided in each state for "the endowment for and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Massachusetts accepted the provisions of the Morrill Act in 1863 by founding a new college at Amherst to be known as "Massachusetts Agricultural College." Chapter 75 of the General Laws of the Commonwealth states that "the leading object of the College shall be to teach subjects relating to agriculture and the mechanic arts so as to promote liberal and practical education. Its curriculum may include other scientific and classical studies and shall include military tactics."

The Trustees of Massachusetts Agricultural College were incorporated in 1863, and officers were appointed in that year. It was not until October 2, 1867, however, that the College was formally opened to students. At that time there were four teachers on the faculty and four wooden buildings on the campus. The enrollment steadily increased during the first term, however, and by December 1867, forty-seven students had been admitted. From this modest beginning the College has grown steadily, both in number of students and scope of its work. In April, 1931, the name of the institution was changed by legislative enactment to Massachusetts State College. In 1939 the Trustees voted to award the A.B. degree as well as the B.S., which previously had been the undergraduate degree of the College. In May, 1947 the College became the University of Massachusetts.

FUNCTIONS OF THE UNIVERSITY

The University of Massachusetts now serves the Commonwealth in the three important fields of resident instruction, re-

search, and extension. Since all three services are organized on the campus, students have the advantages that come from contact with persons carrying education to the State at large, with others conducting original investigations, as well as those engaged in formal instruction.

RESIDENT INSTRUCTION

DEGREE COURSES

THE UNDERGRADUATE COLLEGE. The University offers four-year undergraduate instruction leading to the following degrees: Bachelor of Science, Bachelor of Arts, Bachelor of Science in Agricultural, Civil, Electrical and Mechanical Engineering, Bachelor of Business Administration and Bachelor of Vocational Agriculture.

This instruction is assigned to the Schools of Liberal Arts and Science, the Schools of Agriculture and Horticulture, Business Administration, Engineering, Home Economics, and to the Division of Physical Education. The aim of the four-year course is to give as high a degree of proficiency in some particular branch of learning as is possible without sacrificing the breadth, knowledge, and training which should characterize a well-rounded college education.

The degree of Bachelor of Science is conferred upon those candidates who complete the curriculum requirements of the first two years, the specialization requirements of the School of Science, or of the Schools of Agriculture, Horticulture, or Home Economics, or the Division of Physical Education for Men. Candidates for the Bachelor of Science degree must also earn enough additional credits to bring the total junior-senior credits to 60. This degree will also be granted to students majoring in Psychology or Education if they elect fifteen credits in science departments in the junior and senior years.

The degree of Bachelor of Arts is awarded to all candidates in the School of Liberal Arts who complete the requirements of the freshman and sophomore years, the departmental requirements of the junior and senior years, and earn enough additional credits to bring the two-year total to 60. Students in the School of Science may qualify for the A.B. degree by satisfying the requirements of the School of Science for the freshman and sophomore years, completing the departmental requirements in the junior and senior years, and supplementing these with 18 additional credits in the School of Liberal Arts.

All graduates from the School of Engineering will receive the appropriate degrees of Bachelor of Science in Civil Engineering, Electrical Engineering, Mechanical Engineering and Agricultural Engineering.

All graduates from the School of Business Administration will receive the degree of Bachelor of Business Administration.

Special arrangements are made for some graduates of county agricultural schools and of agricultural departments of certain high schools to complete the college course with majors in agriculture or horticulture. Upon the completion of their course they will be granted a Bachelor of Vocational Agriculture degree.

GRADUATE SCHOOL

THE GRADUATE SCHOOL. Graduate courses leading to advanced degrees are available in the Graduate School. Majors leading to the Master of Science or Doctor of Philosophy degree may be taken in the following fields: Agronomy, Bacteriology, Botany, Chemistry, Economics, Entomology, and Food Technology.

In addition, the following departments offer major work leading to a Master of Science degree only: Agricultural Economics and Farm Management, Animal Husbandry, Business Administration, Dairy Industry, Education, Engineering, Floriculture, Geology and Mineralogy, Home Economics, Mathematics, Olericulture, Physical Education (Men), Pomology, Poultry Science, Psychology, Wildlife Management, and Zoology.

Students may enroll as candidates for the Master of Arts degree, subject to the conditions to be found in the Graduate School catalogue, in the following fields: Economics, English, History, Philosophy, and Romance Languages.

The degree of Master of Landscape Architecture is granted to students completing the two years' graduate work offered by the Department of Landscape Architecture, while students taking the equivalent of one year's graduate work in that major may be granted the degree of Bachelor of Landscape Architecture.

Several other departments in the University, while not regularly organized for major work in the Graduate School, do, nevertheless, offer courses which may be selected for minor credit. These are: Forestry, German, Physics, Sociology, and Veterinary Science.

The general requirements of the Graduate School regarding entrance, residence, credits, tuition, fees, etc., together with specific

information concerning details of interest to prospective students, are outlined in a separate bulletin, which may be obtained upon request from the Dean of the Graduate School.

SUMMER SCHOOL

THE SUMMER SCHOOL. A Summer Session is available for those desiring to accelerate their program. This Summer Session is planned to serve the needs of (1) all students enrolled as candidates for a degree at any college, (2) persons desiring refresher or professional improvement courses, (3) graduate students desirous of meeting specific requirements in certain fields, and (4) any adult person who finds courses suited to his preparation and needs. Applications for the Summer School may be obtained by writing to the Dean of the University.

Two six weeks' sessions will be offered in the summer of 1951.

NON-DEGREE SHORT COURSES

The University, through its Short Course division, as a special service under the Land-Grant Act by which it was established, provides a complete program of two-year technical and vocational courses in the fields of agriculture and horticulture. These train for all types of commercial farming operations as practiced in New England.

Other short courses, varying in length from one to ten weeks, furnish supplementary training for city and town sanitary inspectors, tree wardens and city foresters, golf course greenskeepers, and skilled workers in dairy and ice cream plants.

THE STOCKBRIDGE SCHOOL OF AGRICULTURE. This School was organized at the University in 1918 under the name of "The Two Year Course in Practical Agriculture." Its purpose was to meet the demand for shorter courses in agriculture which might be taken by high school graduates who could not satisfy college entrance requirements, or who, for one reason or another, were unable to take the four year college course. In 1928 the School was given its present name in honor of Levi Stockbridge, the first professor of agriculture at the University and its fifth president.

This program trains men and women primarily for the practice of farming or associated agricultural industries. Graduation from the School does not fulfill the requirements for entrance into the degree course, nor are credits earned during the course regu-

larly transferable toward credit for a degree. A diploma is awarded for satisfactory completion of any two-year course; for other short courses certificates are presented.

As the two-year program is now organized, a student may choose any one of eleven vocational courses, including dairy farming; dairy manufactures or milk plant operation; poultry farming; arboriculture, or the care of trees; fine turf maintenance for golf courses, cemeteries, parks, and playgrounds; commercial flower growing, both retail and wholesale; food management for clubs, hotels, and restaurants; commercial fruit farming; ornamental horticulture, or landscape gardening; commercial vegetable farming; and applied forestry for timber growing and forest product industries.

On-the-job placement training is required of all first-year students in the second semester for a period of four to seven months, depending on type of employment. No student can earn a diploma of graduation without this applied training experience. Wages earned can pay a large part of the second year expenses if the student is forced to economize.

Limited enrollment quotas in each major course make necessary early filing of application. No formal entrance examinations are required for non-degree short courses.

A Catalog, giving complete description of all two-year courses offered in The Stockbridge School of Agriculture, as well as full details on estimated costs, employment opportunities in each field, and entrance arrangements, is available. Application form is printed in the catalog. Write to Director of Short Courses, University of Massachusetts, Amherst, Massachusetts.

NOTE: (For interview or personal conference the Short Course Office is open Monday through Friday from 8:30 to 12:00 and 1:00 to 5:00, state and national holidays excepted.)

RESEARCH AND REGULATORY SERVICES

The University of Massachusetts serves the fields of Agriculture and Horticulture through its Experiment Station, which provides research and regulatory services. Experiment Stations were established in all States as the need for development of practical information on subjects relating to Agriculture became apparent. Through the efforts of experiment Stations a fund of scientific

knowledge applicable to Agriculture and Horticulture has been accumulated, and research workers in the Experiment Stations continue to contribute to this knowledge by constant research and experimentation.

At the University of Massachusetts, the Experiment Station service has expanded until it now deals with problems in the following fields of specialization: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Dairy Industry, Economics, Engineering, Entomology, Horticulture, Floriculture, Food Technology, Nutrition, Olericulture, Pomology, Poultry Science, and Veterinary Science. Most of the research activities of the University of Massachusetts are undertaken at the main Experiment Station at Amherst. There are, however, two substations, one at Waltham, devoted largely to the problems of Horticulture as applied to Olericulture, Floriculture, and Nursery culture, and one at East Wareham, where attempts are in progress to solve the problems of the cranberry and blueberry growers.

In addition to the work described above, the administration of certain regulatory services, as pertaining to the sale of feeds, fertilizers, and seeds and to the use of dairy glassware is also assigned to the Experiment Station, which is equipped with the necessary laboratory facilities and personnel for that purpose.

EXTENSION SERVICE

The Massachusetts Extension Service is a cooperative teaching effort between the United States Department of Agriculture, the University of Massachusetts, and the several counties of the State. The work of the Extension Service is carried on through unified teaching programs in all parts of Massachusetts. The Extension Service assists the people of the farm, the home, and the rural communities to improve agriculture, home making, and rural life. The University of Massachusetts is the State Extension Service headquarters. Extension educational teaching plans are made in council with the people who determine their problems and help to suggest methods and practices for their solution.

The Extension effort was brought about by the Smith-Lever Law, passed by Congress on May 8, 1914. Since that time, the service has grown to a staff of over 100 State and County workers who conduct an educational program in all phases of agriculture and home-making among the adults and young people (4-H Club work) of the State. All types of methods, including subject mat-

ter, meetings, demonstrations, farm and home visits, publications, visual aid, and radio are used in carrying out this educational program directly in the farm and rural areas of the State. During the war emergency, the Extension Service extended its home food production and preservation program to the urban areas.

THE UNIVERSITY CAMPUS

The University of Massachusetts is located near the geographical center of the state at Amherst. This town of about 7,000 overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted both for its scenic beauty and its educational institutions. The setting for the University, therefore, is ideal. The surrounding country is a rich agricultural region providing an excellent outdoor laboratory for the work in Agriculture and Horticulture, as well as for the Biological Sciences and Geology. Those interested in other Sciences and in Liberal Arts study under equally favorable conditions, both because of the facilities at the University and its location in this educational area of the valley.

Amherst is eighty-seven miles from Boston and may be reached by bus connections from Northampton, Greenfield, Springfield, and Worcester. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. In addition, the University owns another area of seven hundred and fifty-five acres six miles north of the campus on Mount Toby. This is used as a demonstration forest.

The University also operates a horticultural field station at Waltham and a cranberry field station at East Wareham.

BUILDINGS AND EQUIPMENT

The campus is laid out in the form of an oval attractively set off by the College Pond in the center. Around this oval are grouped the main buildings of the University. Those using the attached map of the campus are advised to start at South College, the Administration Building, and proceed in the order indicated below.

SOUTH COLLEGE.—Here are located the administrative offices including those of the President, Dean, Registrar, Treasurer, Secretary, Director of the Extension Service, Director of the Placement Service, Dean of Women, and Dean of Men. Erected 1885.

NORTH COLLEGE.—The University Store, offices and classrooms of the School of Business Administration and the Department of Economics. Erected 1868.

FARLEY 4-H CLUB BUILDING AND BOWDITCH LODGE.—Headquarters for 4-H Club Activities. Erected 1933 and 1936 respectively by funds contributed by 4-H Club members and interested friends and organizations. The former was named to honor George L. Farley for twenty-five years State Leader of County Club Agents; the latter for Nathaniel Bowditch, Trustee of the University from 1896-1945.

POWER PLANT.—General Maintenance.

LIBERAL ARTS BUILDING.—Classrooms, laboratories and offices for Foreign Languages, Psychology and Education. Erected 1947.

GRINNELL ARENA AND ABATTOIR.—Erected in 1910 primarily for livestock judging. An abattoir was constructed in 1930 as an addition to the original building. Named in honor of James S. Grinnell, for twenty-two years a trustee of the University.

FLINT LABORATORY.—Laboratories and classrooms for Dairy Industry. Erected in 1911 and named for Charles L. Flint, fourth president of the University.

STOCKBRIDGE HALL.—Departments of Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Engineering and Poultry Husbandry. Erected in 1914 and named for Levi Stockbridge, first Professor of Agriculture and a former President of the University. Bowker Auditorium, the main auditorium of the University, is located here. It is named for William H. Bowker, a member of the first graduating class, a trustee of the University, and one of the pioneers in the fertilizer industry.

CHENOWETH LABORATORY.—Classrooms and laboratories including a large Commercial Canning Practices Laboratory for the Department of Food Technology. Erected 1929 and named in honor of Walter W. Chenoweth, pioneer in the field of Food Technology and first Head of the Department.

NUTRITION LABORATORY.—A laboratory for the study of small animals and chickens in connection with investigations into human, animal, and poultry nutrition.

ENGINEERING ANNEX.—Laboratories, classrooms, and offices for the School of Engineering. Erected 1948.

ENGINEERING SHOP.—Laboratories and shop for machine tools, woodworking, motors, and welding instruction. Erected 1916.

DRAPER HALL.—University Dining Hall. Erected 1903 with an addition in 1912. Named in honor of James Draper, for twenty years a trustee of the University. Annex erected 1947.

PAIGE LABORATORY.—Erected in 1950 and named in honor of James B. Paige, Professor of Veterinary Science from 1891-1922. The building contains classrooms and laboratories. Laboratories for State Control and research work in animal diseases are located here.

GUNNESS LABORATORY.—Laboratories for internal combustion engines, materials testing, fluid mechanics, heating, air conditioning and refrigeration, electrical machinery, electrical circuits, as well as classrooms and offices for the School of Engineering. Built in 1948 and named in honor of Christian I. Gunness, Professor of Agricultural Engineering from 1914 to 1946.

ELECTRICAL ENGINEERING WING.—Completed in 1950, this portion of the proposed main Engineering building provides laboratories for Industrial Electronics, Communications, Ultra High Frequency, Electrical Measurements, Illumination and Metallurgy, as well as classrooms and offices for the School of Engineering. This structure is planned as a wing for the future main Engineering building of the University.

GOESSMANN LABORATORY.—Contains eight large laboratories, an auditorium, chemical library, and lecture rooms. The east wing of the third floor is used by the Experiment Station chemists. The remainder of the building is for resident instruction in Chemistry. Erected in 1924 and named in honor of Charles A. Goessmann, first Professor of Chemistry at the University.

WEST EXPERIMENT STATION.—The State Control Service is centralized here. Fertilizers, seeds, and feeds are analyzed or inspected in accordance with the state law. Erected 1886.

EAST EXPERIMENT STATION.—Here are located the offices of the Director of the Experiment Station and Graduate School and other administrative officials.

ABIGAIL ADAMS HOUSE.—Women's dormitory accommodating 100 students. Erected in 1919 and named for Abigail Adams, wife of John Adams, second President of the United States.

THE HOMESTEAD.—Girls majoring in Home Economics receive their Home Management practice here. This is a fine old colonial homestead newly equipped with all the modern conveniences of the home.

HAMLIN HOUSE.—A self-liquidating dormitory housing 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1949. Named for Margaret P. Hamlin, first Placement Officer for Women, 1919-1948.

KNOWLTON HOUSE.—A self-liquidating dormitory with accommodations for 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1950. Named in honor of Helen Knowlton, Associate Professor of Home Economics, 1924-1941.

LEWIS HOUSE.—Women's dormitory accommodating 150 students. A self-liquidating dormitory erected under the sponsorship of the Associate Alumni in 1940 and named in honor of Edward M. Lewis, Dean of the College 1914-25 and President 1925-27.

THATCHER HOUSE.—Women's dormitory with facilities for 150 students. Erected in 1935 and named in honor of Roscoe W. Thatcher, President of the College 1927-32.

UNIVERSITY INFIRMARY.—A group of three buildings, one for bed patients, one for out patients and a third for contagious cases.

MARSHALL HALL.—Erected in 1915 and named for Dr. Charles Marshall, a former Professor of Bacteriology and Director of the Graduate School. The building provides laboratories and classroom space for the Department of Bacteriology and the Department of Zoology.

SKINNER HALL.—Laboratories, classrooms and offices for the School of Home Economics. Erected in 1947 and named in honor of Edna L. Skinner, first Dean of the School of Home Economics.

HASBROUCK PHYSICS LABORATORY.—Completed in 1949. Contains laboratories and lecture rooms designed for the various main divisions of Physics. Named in honor of Philip B. Hasbrouck, Professor of Physics and Registrar of the College during the period 1905 to 1924.

FORESTRY SCIENCES.—Formerly the Old Botany Museum, erected 1867. Houses laboratories, classrooms and offices for the Departments of Forestry and Wildlife Management.

FISHER LABORATORY.—Erected in 1910 and named for Jabez Fisher, one of the foremost early horticulturists of the state. Laboratories for Pomology. Included are a quick freezing room, six refrigerator rooms, two rooms for the storage of frozen products, two classrooms, and three packing rooms.

WILD LIFE LABORATORY.—Laboratories for the Department of Wild Life Management.

WILDER HALL.—Here are the classrooms, drafting rooms, and offices of the Department of Landscape Architecture. Erected in 1905 and named for Marshall P. Wilder, a pioneer in the movement for agricultural education in Massachusetts, and one of the first trustees of the College.

FRENCH HALL.—French Hall, built in 1908 and named in honor of Henry F. French, the first President of the College, houses the Departments of Floriculture, Forestry, Pomology, and Olericulture. In the rear of the building is the new Durfee range of greenhouses, built in 1908 and devoted to the growing of carnations, roses, chrysanthemums, etc. One house is maintained as a conservatory and contains a collection of plants used primarily for decorative purposes. The old Durfee range just north of French includes a collection of tropical and semi-tropical plants of botanical and horticultural importance. It was erected in 1867 from money given by Dr. Nathan Durfee of Fall River, treasurer of the board of trustees.

STOCKBRIDGE HOUSE.—Faculty Club House.

SHADE TREE LABORATORIES.—Constructed in 1948 for research on shade tree problems including Dutch Elm Disease.

CLARK HALL.—Offices, lecture rooms, laboratories, and greenhouses of the Department of Botany are located here. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and a collection of 25,000 specimens of fungi. The building was erected in 1906 and named in honor of William S. Clark, President of the College and Professor of Botany from 1867 to 1879.

FERNALD HALL.—Erected in 1909 and named in honor of Professor Charles H. Fernald who served the College from 1886 to 1909, built up a strong Department of Zoology, created the Department of Entomology, and acted as Director of the Graduate School. Fernald Hall houses the Departments of Entomology and Geology and offices and classrooms of the Department of Zoology. Offices and laboratories of the Western Sanitary District, Massachusetts Department of Public Health, are also located here. The Entomology collection includes over 160,000 insects. There are also Geological and Zoological museums.

MATHEMATICS BUILDING.—Classrooms and offices of the Mathematics Department.

MILLS HOUSE.—Men's dormitory for 150 students. A self-liquidating dormitory erected in 1948 under the sponsorship of the Associate Alumni. Named in honor of George F. Mills, teacher of English from 1899 to 1914 and Head of the Division of Humanities.

BROOKS HOUSE.—Men's self-liquidating dormitory. Named in honor of William Penn Brooks, Professor of Agriculture and Director of the Experiment Station, 1888-1921.

BUTTERFIELD HOUSE.—Men's dormitory including dining hall. Accommodates 147 students. A self-liquidating dormitory erected in 1941 under the sponsorship of the Associate Alumni. Named in honor of Kenyon L. Butterfield, President of the College 1906-1924.

CHADBOURNE HOUSE.—Men's dormitory for 150 students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of Paul Ansel Chadbourne, President 1866-67 and 1882-83.

EXTENSION SERVICE BUILDING.—Headquarters for the Massachusetts Extension Service.

GREENOUGH HOUSE.—Men's dormitory and dining hall. Houses 148 students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of James Carruthers Greenough, President of the University from 1883-86.

CURRY S. HICKS PHYSICAL EDUCATION BUILDING.—Erected in 1931 from funds contributed by Alumni and friends of the College plus an appropriation by the state legislature. Contains a large swimming pool, an exercise hall, basketball floor, and locker room. The Health Office and x-ray room are also located here. Named for Curry S. Hicks, Professor and Head of the Division of Physical Education from 1911 to 1949.

ALUMNI FIELD.—So called because both funds and labor for its construction were contributed by alumni and students. Included are a baseball diamond, football and soccer fields, and a cinder track. Ten tennis courts are adjacent to the Physical Education Building.

ATHLETIC FIELD FOR WOMEN.—A large field west of the Physical Educational Building provides space for archery, softball, field hockey, and other women's activities.

FEDERAL CIRCLE.—A series of temporary buildings furnishing 94 apartments of varying size for married veterans. Erected in 1946 in cooperation with the Federal Government.

COUNTY CIRCLE.—Five residence halls erected in 1948 by the Commonwealth. Hampshire and Suffolk Houses contain 30 two and three room apartments for married persons and their families. Plymouth, Berkshire, and Middlesex Houses contain dormitory rooms for approximately 144 students each.

COLLEGE ARMORY.—Contains in addition to the offices of the Department of Military Science, the offices, locker and dressing

rooms, and exercise hall for the Department of Physical Education for Women.

MEMORIAL HALL.—Erected in 1921 by Alumni and friends in memory of those men of the College who died in World War I. Included is a Memorial Room in which the names of those members of the College family who died in the service of their country are appropriately enshrined. This building is a social center of student life. Alumni headquarters are here, as well as the offices of student organizations including the Senate, Collegian, and Index. The Associate Alumni are at the present time in the process of raising a fund to add a large wing to this building. The purpose of the new wing is to commemorate the sacrifices made by our college men who gave their lives for their country in World War II.

OLD CHAPEL.—Erected in 1885. Auditorium, seminar room, classrooms, and offices for English and History. The chime in the Chapel tower was presented in 1937 in memory of Warren Elmer Hinds of the class of 1899 by his classmate, Bernard H. Smith.

GOODELL LIBRARY.—Goodell Library is named in honor of Henry Hill Goodell, who served the College from 1867-1905. He was President from 1886 to 1905 and because of his deep enthusiasm for books also acted as Librarian of the College.

Goodell Library is virtually a fireproof building erected in 1935. Its plan is unique in that the book-stacks are open freely for inspection and borrowing.

The main floor includes a large reading room, a reference room, delivery desk, and cataloging and administrative offices. On the second floor is another large reading room, commonly used for reserve book reading. There are also studies for faculty and students and the University of Massachusetts Memorabilia Room.

Besides Goodell Library there are 52 departmental libraries ranging from small collections to sizable separate libraries with reading rooms and valuable collections of reference and textbooks.

The complete library system contains 160,000 volumes and is growing at the rate of over 4,000 volumes a year. The library regularly receives 600 periodicals, and also the serial publications of learned societies. It is also a depository for government documents of the United States Department of Agriculture and the various State Experiment Stations.

INFORMATION CONCERNING THE UNIVERSITY COURSE

The sections of the catalogue that follow are primarily for undergraduate students in the four year degree course. Those interested in graduate study are referred to the Graduate School catalogue, and in short courses, to the catalogue of the Stockbridge School of Agriculture and other short course publications.

STUDENT EXPENSES

Expenses vary from approximately \$750 to \$850 per year for the normally economical student. First year costs are usually greater than those of the other three years and there is less opportunity to earn. A student is advised to have to have a definite plan for meeting the expenses of the first year before entering.

The following estimate of a year's expenses, based upon last year's cost, includes only those items which are strictly college and does not include amounts for clothing, laundry, travel, etc. These costs vary slightly from year to year. Tuition for residents of Massachusetts is \$100 per year and for others \$400.

	Normal
Tuition (citizens of Massachusetts)	\$100.00
Room in college dormitory or private home (ave.)	165.00
Board at University Dining Hall	350.00
Books, stationery, and other supplies	90.00
Student Tax (approx.)	38.50
	\$743.50

INITIAL PAYMENT FOR FRESHMEN

The initial payment required of freshmen at the time of fall registration is indicated below and is made up of the following items:

Tuition (citizens of Massachusetts)	\$ 50.00
Room rent (dormitory) approximately	82.50
Board (University Dining Hall)	145.00
Military Uniform (men students)	30.00
Student Tax	20.00
Books, Stationery, etc.	45.00
	\$372.50

The above are only approximate figures. A bill will be rendered to the parent of each student prior to the opening of the University.

TUITION.—As a state institution the University of Massachusetts offers a low rate of tuition to all students entering from the Commonwealth. Eligibility for admission under the low residential rate is determined in accordance with the following policy established by the Board of Trustees.

A student must present evidence satisfactory to the Treasurer of the University that his domicile is in the Commonwealth of Massachusetts in order to be considered eligible to register in the University as a resident student. This means that he must have established a *bona fide* residence in the Commonwealth with the intention of continuing to maintain it as such.

The domicile of a minor shall follow that of the parents unless such minor has been emancipated. In case of emancipation the student, in addition to the requirements of these regulations respecting residence, shall present satisfactory proof respecting emancipation. Minors under guardianship shall be required to present, in addition to the certification of the domicile of the guardian, satisfactory documentary evidence of the appointment of the guardian.

No student shall be considered to have gained residence by reason of his attendance in the University nor shall a student lose residential preference during his continuous attendance at the University.

The residence of a wife shall follow that of the husband.

The prescribed form of application for classification as to residence status must be executed by each student. Misrepresentation of facts in order to evade the payment of out-of-state tuition shall be considered sufficient cause for suspension or permanent exclusion from the University.

Discretion to adjust individual cases within the spirit of these rules is lodged with the President of the University.

BOARD.—The University provides three dining halls for students at Butterfield House, Greenough House and Draper Hall. The dining halls at Butterfield and Greenough dormitories are intended primarily to provide students housed in that area, including residents of Chadbourne, Mills and Brooks Houses.

All freshmen except commuters will be required to board at University dining halls on a five-day week basis.

Sophomores and juniors residing in University dormitories and other campus buildings will also be required to board at Uni-

versity dining halls except that such students who are members of fraternities or sororities may be permitted upon request to board at their respective fraternities or sororities.

Any student who wishes may board at University dining halls on the ticket plan or cash basis.

MILITARY UNIFORM.—All students taking military drill are required to make a deposit of \$30 for the uniform. A rebate of this amount is made when the uniform is returned.

STUDENT ACTIVITY TAX.—This tax, authorized by vote of the undergraduate students with the approval of the Board of Trustees, provides each student with the Collegian, the student newspaper; the Index, the University annual; Handbook, Concert course, and student government, class and other activities.

ADVANCE PAYMENT

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Registrar that they are accepted for admission. This will be considered as first payment on registration fee, which will be due at time of matriculation in September. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

A Certificate of Residence form furnished by the University must be properly filled out by the parent and the town or city clerk and returned with the \$15.00 advance payment.

WHEN PAYMENTS ARE DUE

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board, and room rent in University Dormitories are due and payable seven days prior to the date of registration for each semester. Bills will be rendered in advance and payment may best be made by mail. Students may not register until registration charges are paid.

LATE REGISTRATIONS

Any student who does not make payment of his semester charges within the time specified or who does not complete his registration on the date prescribed will be required to pay a fine of \$5.00.

REFUNDS

A student who leaves the University for any reason before a semester is half completed will have refunded to him one-half the

fees paid for that semester, but one who leaves after a semester is half over will be allowed no rebate of fees. There will be no refund of prepaid rent.

VETERANS' INFORMATION

Veterans who are entering the University for the first time under the G. I. bill must present Certificate of Eligibility at registration. This may be obtained from your nearest Veterans Administration office. Veterans failing to obtain Certificate of Eligibility must make payment of tuition and fees in order to register. Board and room fees must be paid in advance whether enrolled under the G. I. bill or not.

Veterans who are transferring to the University of Massachusetts from another institution or who have done summer work at another institution will be required to submit a supplemental Certificate of Eligibility at registration. This may be obtained by applying through the veterans' office at the institution last attended.

FINANCIAL REQUIREMENTS FOR GRADUATION OR HONORABLE DISMISSAL

Diplomas, transcripts of record, and letters of honorable dismissal will be withheld from all students who have not paid all bills and all loans due the University or all legitimate bills for room rent, board, and medical fees due fraternities or private individuals. All such bills due the University must be paid ten days preceding Commencement. If paid after that date and the student is otherwise eligible, he may graduate the following year.

Private creditors of students must present itemized statements of charges to the Treasurer of the University at least 15 days before graduation if they wish to have their claims recognized by the University.

FINANCIAL AID

Scholarships, loans, and part-time employment are available for a limited number of needy and deserving students.

AID FOR FRESHMAN YEAR.—Freshmen are eligible for scholarships and part-time employment. A freshman also becomes eligible for assistance from loan funds after satisfactorily completing one semester of academic work. Scholarship application blanks may be secured from the Registrar and should be filed by May 1. Part-time employment application forms may be obtained from the Director of Placement Service and filed after a candidate has been accepted for admission.

Because of the time required for preparation of studies, few students should plan to spend more than ten hours per week in part-time employment.

AID FOR UPPERCLASSMEN.—To become eligible for financial assistance, whether scholarship, loan, or part-time employment, students must file completed financial aid application forms with the Student Aid Committee in the Placement Service Office by March 1 previous to the college year for which assistance is asked.

SCHOLARSHIPS

Scholarships are awarded only to needy and deserving students of high character whose habits of life are economical and whose scholastic records are satisfactory. A limited number of these scholarships are available for entering freshmen.

Scholarships are paid in installments at the beginning of each semester in form of a credit on the student's bill. A scholarship may be discontinued at the close of any semester if the scholastic record of the recipient is unsatisfactory.

If a scholarship student withdraws from the University, any refund of University fees or charges must first be applied to reimburse the scholarship fund for the full amount of the scholarship received by the student for the semester.

The following scholarships are available:

ALVORD DAIRY SCHOLARSHIP.—for a worthy student specializing in the study of Dairy Husbandry with the intention of becoming an investigator, teacher, or special practitioner in connection with the dairy industry.

DANFORTH KEYES BANGS SCHOLARSHIP.—for the aid of industrious and deserving students.

CHI OMEGA AWARD.—The local chapter of the Chi Omega Sorority offers an annual scholarship of \$25 to that woman student majoring in the department of economics or psychology who has the highest scholastic average at the end of the first semester of the senior year.

LUCIUS CLAPP FUND.—to provide scholarships and loans to deserving students.

CLASS OF 1882 SCHOLARSHIP.—for the aid of a worthy student of the junior or senior class.

FREDERICK G. CRANE SCHOLARSHIPS.—for the aid of worthy undergraduate students, preference being given to residents of Berkshire County.

J. D. W. FRENCH SCHOLARSHIPS.—for deserving students in dairy-ing and allied subjects; also Forestry.

HENRY GASSETT SCHOLARSHIP.—for a worthy undergraduate student.

CHARLES A. GLEASON SCHOLARSHIPS.—general scholarship for worthy students.

CHARLES H. HOOD DAIRY SCHOLARSHIPS.—An annual grant of \$800 for two scholarships to be awarded to seniors whose ultimate object is the operation of their own dairy farms.

LOTTA SCHOLARSHIPS.—The Trustees of the Lotta Crabtree Agricultural Fund have made available a substantial sum for scholarships. These are limited to students registered in the Schools of Agriculture, Home Economics, Horticulture and Science. One-fourth of the amount granted is awarded to freshmen.

MARGARET F. MOTLEY SCHOLARSHIP.—one scholarship of \$100 for an upperclass student studying Horticulture, Landscape Architecture, or Floriculture.

PORTER L. NEWTON SCHOLARSHIPS.—for the aid of worthy and deserving students in the field of agriculture.

BETSEY C. PINKERTON SCHOLARSHIPS.—two general scholarships for graduates of the schools of the city of Worcester.

SEARS SCHOLARSHIPS.—The Sears Roebuck Company provides for eight scholarships of \$125.00 each which are awarded annually to deserving men students in the freshman class who desire to major in Agriculture. This year the Sears Roebuck Company made similar grants to woman students majoring in Home Economics.

WHITING STREET SCHOLARSHIPS.—Scholarships of \$50 each for deserving students.

HELEN A. WHITTIER SCHOLARSHIP.—for a deserving woman student in art as applied to living.

There are also the following special scholarships:

COTTING MEMORIAL SCHOLARSHIP.—all college expenses of freshman year—for a woman student. Recipient of this scholarship is selected by a committee of the New England Branch of the Farm and Garden Association from among candidates proposed by State Leaders of 4-H Club work in the New England states.

WILBUR H. H. WARD SCHOLARSHIPS.—Twenty-five scholarships of approximately \$100, known as the Wilbur H. H. Ward Scholarships. The Wilbur H. H. Ward Fund is administered by

a Board of Trustees independent of the University. Applicants for these scholarships write to Sumner R. Parker, who may be addressed at the University. They are available only to Hampshire County boys.

THE ISOGON AWARD.—An award by Isogon, the senior women's honorary society, to a young woman student at the end of her junior year. This award is made on the basis of character and personality, scholastic achievement, campus influence and service.

GEORGE L. FARLEY SCHOLARSHIPS.—The Massachusetts Society for Promoting Agriculture has established a scholarship in memory of George L. Farley. The income of approximately \$60 per semester is awarded to deserving 4-H Club members, men or women, recommended by the State Leader of 4-H Clubs from applications submitted to County 4-H Club Agents.

ESSO 4-H SCHOLARSHIP.—Every year the Colonial Beacon Oil Company awards a scholarship of \$400.00, one-fourth of which is paid each year to a 4-H Club member enrolled in some course related to Agriculture. Selection is on the basis of need, merit, and ability. Applications should be sent to County 4-H Club Agents.

THE BORDEN COMPANY FOUNDATION.—Provides an annual Scholarship Award of \$300 to that senior student in Agriculture who has achieved the highest average grade in all college work preceding the senior year. No student whose curriculum did not include at least two courses in Dairy subjects is eligible.

NEVILLE STURGIS SCHOLARSHIPS.—The income from a trust set up under the trusteeship of DeBlois and Maddison by Neville Sturgis, of Weston, amounting to approximately \$1700 annually. This income is to be used in aiding deserving undergraduate students of the University.

ASCENSION FARM SCHOOL SCHOLARSHIPS.—The trustees of the Ascension Farm School offer annually approximately \$2400 for scholarships. These are restricted to men from Western Massachusetts who are studying in the fields of Agriculture and Horticulture.

ENGINEERING ALUMNI SCHOLARSHIPS.—Provided by annual contributions from graduates and friends of the School of Engineering to provide tuition scholarships to deserving and well-qualified students pursuing work in a major field of Engineering. They are available to freshmen.

NATIONAL ASSOCIATION OF THOROUGHbred BREEDERS SCHOLARSHIP.

—A substantial award granted by the National Association of Thoroughbred Breeders to a freshman who is a member or former member of the Future Farmers of America. The award is established at various other universities as well as at the University of Massachusetts. Applications should be made to the Dean of the University.

LOANS

Through the generosity of friends of the University, funds have been donated to provide loans for a limited number of students of the three upper classes to assist in paying tuition or other college expenses. These loans are granted, after proper consideration, to needy students of good scholarship whose habits are economical. All loans are secured by a note endorsed by a responsible party as collateral. All such loans must be paid before graduation. Upon withdrawal from the University, loans automatically become due. Interest is charged at the rate of 3% to maturity, 5% thereafter on loans from all funds except the Lotta Agricultural Fund, from which loans are made without interest. Application for loans should be made to the Student Aid Committee, Placement Service Office, South College. No loan will be granted in excess of \$200 in any one year.

If funds are available at the beginning of the second semester, loans may be made in exceptional cases to members of the Freshman class whose scholastic record is satisfactory and whose budget calculations have been upset through circumstances beyond their control.

DANFORTH KEYES BANGS FUND.—This is a gift of \$6,000 from Louisa A. Baker, of Amherst, the income of which is used in aiding needy, industrious and deserving students to obtain an education at the University of Massachusetts.

LOTTA AGRICULTURAL FUND.—A limited number of loans are made to students from the income of this fund. Such loans are made without interest, but only to deserving students of high scholastic rank. This fund is administered by a Board of Trustees independent of the University, although loans are made only upon the recommendation of the President of the University.

VINCENT GOLDTHWAIT MEMORIAL LOAN FUND.—A gift of \$5,000 from Dr. Joel E. Goldthwait in memory of his son. This fund is used almost entirely for students in the Stockbridge School of Agriculture.

FRANK A. WAUGH FOUNDATION.—Graduates of the Department of Landscape Architecture and friends of Professor Frank Waugh have established this fund, to be used in part for loans to deserving seniors and fifth-year students of that department. Requests for loans shall be reviewed and approved by the head of the Department of Landscape Architecture and submitted to the Board of Trustees of the Foundation, who shall make final decision as to granting of the loans and amounts thereof.

4-H SCHOLARSHIP AND LOAN FUND.—This fund is under the supervision of the State Leader of the 4-H Clubs and is used to aid students preparing for agricultural and home economics service.

NATIONAL PEST CONTROL ASSOCIATION LOAN FUND.—A fund established by the National Pest Control Association for needy students in the field of Entomology.

THE PLACEMENT SERVICE

The University maintains a centralized Placement Service, the function of which is to assist students to secure part-time, summer, or permanent employment and to administer the required Placement Training Program.

The University is keenly interested that each graduate has an opportunity to serve his fellow men in a socially desirable occupation consistent with his interests, abilities, aptitudes, and education. To assist students to accomplish their objectives, the following aids are available: cumulative student personnel records, occupational information library, counselling and guidance in job hunting techniques, preparation of credentials and personal data sheets and personal interviews.

The Placement Service is the clearing center for all part-time jobs at the University. Students are assisted in obtaining part-time work during the college year and full-time work during the summer vacation. Employment is not guaranteed, but every effort is made to help those students who must work to meet their college expenses. In order to give assistance to as many needy students as possible, the Student Aid Committee has adopted the policy of limiting the maximum financial aid per student to the equivalent

of board or approximately \$350.00. The average earnings of students engaged in part-time work is approximately \$100.00 per year.

VETERANS' AFFAIRS

The Veterans' Coordinator is a member of the Placement Service.

Veterans enrolling for the first time under Public Law 346 must file a Certificate of Eligibility with the Placement Office prior to or at registration. All veterans should clear their affairs through the Placement Service.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by the Health Service is required of all entering freshmen, re-entering students, and all students participating in athletics. This examination is given to freshmen during matriculation week. Evidence of a SUCCESSFUL smallpox vaccination is required.
- (2) The Student Health physicians have offices in the Physical Education Building and in the out-patient Infirmary Building, where they may be consulted during college hours.
- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by one of the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor

accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.

- (5) House calls cannot be made to dormitories, sororities, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.
- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient:
 - (a) *Nurses*.—If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service*.—If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.
 - (c) *Supplies*.—Special medical supplies prescribed by a physician will be charged to the patient.
 - (d) *Laundry*.—Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described

in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accidents and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expense and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

STUDENT HOUSING

It is the policy of the Board of Trustees that freshmen men and women students shall be housed in campus dormitories and be required to eat at University dining halls unless given permission to commute. Sophomore and upper-class students will also be required to live in University dormitories in so far as accommodations are available. Those who cannot be so housed will be given permission to live in fraternity or sorority houses or in private homes.

Students who are assigned to housing operated by the University, or homes approved by the University, are expected to occupy them for the entire school year and may not be released sooner except as their places are taken by suitable substitutes.

Dormitories will be open for occupancy at 1 p.m. on the Sunday immediately preceding the opening of the University.

Students assigned to dormitory rooms will be responsible for the room rent of the entire semester. Room rent is not refundable.

Rooms are furnished except for necessary bedding and linen and are cared for by the students occupying them. Each occupant is held responsible for any damage.

All student property must be removed from the rooms and the key turned in to the Treasurer's Office immediately after final examinations in June. Such property not removed by the owner will be removed by the University and stored at the owner's expense.

The general supervision of the housing conditions of all students is in charge of the Faculty Committee on Housing.

ROOMS FOR WOMEN STUDENTS.—Dormitory rooms are available for women students at Lewis, Thatcher, Abigail Adams, Knowlton, and Hamlin Houses.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time Housemother, so that conditions in the residence halls are conducive to study and good living habits. Through the Women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Freshmen girls will be assigned rooms in the dormitories and will be notified of the assignment prior to the beginning of college.

Near the close of each year, upperclass women will draw numbers to determine the order in which rooms may be chosen for the coming year.

Only students living in their own homes may commute. Upperclass women may apply to the Dean of Women for permission to live in a sorority house, or to earn room and board in a private home.

ROOMS FOR MEN STUDENTS.—Dormitory rooms are available for men students at Butterfield House, Mills House, Greenough, Chadbourne, and Brooks Halls, Berkshire, Plymouth, and Middlesex Houses. Commonwealth Circle, and other new dormitories.

All first-year men students will be assigned to campus dormitories. Upperclassmen should make dormitory room reservations at the Housing Office before May 1. Those who cannot be accommodated in dormitories will be given permission to live in fraternities or private homes. Assignment of dormitory rooms will be under the supervision of the Housing Office.

ROOMS FOR MARRIED STUDENTS.—The University cannot guarantee facilities for married students; however, those married students who can be accommodated will be housed in Federal Circle or the University Apartment Units. Assignments are under the direction of the Housing Office and all inquiries should be addressed to that office. Some students may be able to locate rooms or apartments off campus.

ADVISORY SYSTEM

In order that from the day he enrolls the freshman may have some one to whom he may go for consultation and assistance, each student is assigned to a faculty adviser at the time of registration. It is the function of this adviser to help the student in adjusting himself to the work and life of the University. Academic progress reports issued by the Registrar's Office are sent to the advisers periodically, and the students are expected to report to their advisers from time to time to discuss their academic standing. The adviser also forwards reports of academic standing to the parents. Both students and parents are encouraged to consult with the adviser whenever there are problems regarding studies or personal adjustment to college life.

At the beginning of the second semester of the freshman year each student will discuss his vocational and specialization plans with his adviser. If he can decide definitely upon the department in which he wishes to specialize, and the adviser approves, the student takes his election card to the head of that department for approval. In cases where students are not ready to designate a department of specialization they continue as general majors during the sophomore year under the direction of an adviser assigned by the head of the School in which the student is enrolled. Such general majors must select their field of specialization by the end of the sophomore year.

During the junior and senior years the student is under the guidance of the head of the department in which he is majoring or an adviser assigned by him.

RELIGIOUS LIFE

The University makes an effort to provide a wholesome and stimulating spiritual atmosphere for the students by cooperating with official agencies of the three faiths most largely represented at the University.

On the campus the religious life of Catholic students is enriched by the Newman Club, of which Father David J. Powers of Saint Brigid's Parish is chaplain; Jewish students may participate in services and activities at the local Hillel House, under the chaplaincy of Rabbi Louis Ruchames of Northampton; and Protestant students may join in worship in other religious activities conducted by the Student Christian Association, under the guidance of the Reverend Arnold M. Kenseth, chaplain to Protestant students.

The churches of Amherst provide not only the usual opportunities for worship and participation in church work, but special events for students. Students are particularly encouraged to attend Sunday service in the local church of their respective faiths.

ACADEMIC REGULATIONS

FRESHMAN WEEK

All members of the incoming freshman class are required to be in residence or attendance on the campus for the period known as Freshman Week. During this period an attempt will be made to orient the student. He will be given psychological and mental tests, and a physical examination. Schedules and section assignments will also be arranged. In addition there will be lectures on student activities, customs, and curricula, and a scheduled meeting with the student's adviser.

REGISTRATION

Every student must report for registration on the appointed day. All late registrants must pay a \$5.00 fine. No student will be admitted to any class until he has completed the prescribed registration procedure. Changes of courses on the registration card shall be made by the Registrar's Office only.

Any student who does not complete his registration, including payment of semester charges, on the regular registration days will be required to pay a fine of five dollars.

No course will be recorded on the permanent records of the University nor will a student receive credit for it, unless such course appears on the registration card for the semester and has been properly countersigned by the instructor.

ADDING OR DROPPING COURSES

A student may not add or drop a course except with the approval of the Registrar. A course dropped without approval will be recorded as a failure.

CHANGE OF MAJOR

A student wishing to change his major must get a Program Change Card at the Dean's Office. This change is to be approved by the head of the Department or School in which he is now majoring and also by his new major adviser. This card, properly indorsed, must be returned to the Registrar's Office before the change receives final approval.

MARKING SYSTEM

All grading is done on a numerical basis with 60 per cent the passing grade. A student whose daily work in any course is entirely unsatisfactory will not be permitted to take the final examination in the course and is automatically failed. If a student takes the final examination and fails to pass, the instructor may report either a condition or failure (F). To remove a condition, the student will have an opportunity to take a condition examination, or he may repeat the course. A failed course must be repeated unless permission to substitute another course is granted by the Committee on Scholarship.

The scholastic record of each student is reported to his parents at the end of each semester. Mid-semester marks are sent to parents for the first semester only. A complete report of the scholarship record of each student during his first semester is sent to the principal of the school from which the student entered.

STANDARDS OF DEPORTMENT

The customary high standard of college men and women in honor, self-respect, and consideration for the rights of others constitutes the ideal of student deportment.

The privileges of the University may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the University, acting through its President or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under which they may remain in the institution. For example, if a student is not doing creditable work, he may not only be disciplined, but he may also be required to meet certain prescribed conditions in respect to his studies even though under the foregoing rules his status as student be not affected. The same provision applies equally to the matter of absences. According to the rules, juniors and seniors are allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the University authorities, a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary; moreover, it may be withdrawn as a punishment for misconduct.

Hazing in the sense of the punishment or humiliation of students is not permitted.

REQUIREMENTS FOR GRADUATION

At the beginning of his freshman year each student selects a school or division in which he will carry his major work. One of the fundamental objectives of all programs, however, regardless of School, is a general cultural education which should be the mark of every college graduate. With this end in view all candidates for the B.S. or A.B. degree must take certain required courses: English 1, 2, 25, 26; Speech 3 and 4, Economics 25; Psychology 26; and twelve semester hours of science. In addition, at least three hours must be elected from one of the following: History 5, 6, 59, 60, or Government 25.

The requirements in Physical Education must also be satisfied. All physically fit men students must take Military 1, 2, 25, and 26. A course of lectures on College Adjustments is required of women students.

Since the work of the first two years is largely directed toward a broad, general education as a foundation for the more specialized training of juniors and seniors, it follows that the program of studies for all schools is fairly uniform up to the junior year. Because of this, students can readily change from one curriculum to another, or even from one school to another as both freshmen and sophomores.

Regardless of major, students who plan to teach should register early, in their freshman year if possible, with the Department of Education, although their work there does not begin until the junior year.

The minimum requirement for graduation is 60 junior-senior credits in addition to the satisfactory completion of the required and elective work of the first two years. Except upon special permission from the Scholarship Committee, no junior or senior shall enroll for more than 17 or less than 14 credits each semester.

During the junior and senior years, each student shall complete not less than 15, and not more than 30 credits in junior-senior courses in the department in which he is specializing.

A new administrative organization which will combine the School of Liberal Arts and the School of Science into a College of Liberal Arts and Sciences was approved by the trustees in January, 1949. Until the details of this organization have been worked out, the Schools will continue to function as at present.

TRANSCRIPTS

Two transcripts of a student's record will be furnished without cost. For each additional copy there will be a charge of one dollar.

CONVOCATIONS

Throughout the year each School and Division of the University conducts convocation programs which are especially designed to give students opportunities of hearing from leaders in Science, Art, Government, Education, etc. Some of the convocations are devoted to student activities such as debates, declamation contests, band and musical concerts.

STUDENT ORGANIZATIONS

One of the values received from the University course is the training acquired through participation in student activities. Student organizations offer excellent opportunities for development of leadership and broadening of outlook.

STUDENT GOVERNMENT

The student Senate, operating under the student constitution and composed of elected representatives from the student body, is the governing council of undergraduates. Its aim is to promote the general welfare of the University, and in doing so, groups of both students and faculty meet to further their mutual interests. The student Senate directs student conduct and represents the interests of the student body before the faculty.

ACADEMIC HONOR SOCIETIES

PHI KAPPA PHI.—The Massachusetts Chapter of the Honor Society of Phi Kappa Phi was installed on the campus in 1904. Its prime object is to emphasize scholarship and character. Senior students from all departments of the University are eligible for election to membership provided the scholastic and character requirements of the Society are met.

SIGMA XI.—The Society of Sigma XI is a scientific fraternity to which members are elected on the basis of outstanding scientific research. The local chapter was established in 1938.

STUDENT HONORARY SOCIETIES

ADELPHIA.—A men's Senior honorary society, recognizing men students who have been prominent in the extra curricular activities of the campus.

ISOOGON.—A women's senior honorary society. Its purpose is to recognize outstanding women students on the campus.

FRATERNITIES AND SORORITIES

Social fraternities on the campus include Alpha Epsilon Pi, Alpha Gamma Rho, Kappa Sigma, Lambda Chi Alpha, Phi Sigma Kappa, Q.T.V., Sigma Alpha Epsilon, Sigma Phi Epsilon, Tau Epsilon Phi, and Theta Chi. An Inter-Fraternity council, consisting of representatives of these fraternities, has charge of rushing and all general matters dealing with fraternity life.

Sororities include Chi Omega, Kappa Alpha Theta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Delta Tau, and Sigma Kappa. The Pan-Hellenic Council, made up of representatives from the sororities, supervises rushing and other sorority matters.

ACADEMIC ACTIVITIES

THE COLLEGIAN.—This is a weekly newspaper published by undergraduates.

THE QUARTERLY.—A magazine in which the literary and artistic efforts of the students are published.

INDEX.—The year book.

UNIVERSITY HANDBOOK.—Published annually as a campus book of reference.

The University Musical Clubs include a band, chorale, dance band, operetta guild, the statesmen, and a symphony orchestra. These organizations make various public appearances during the school year both on and off campus.

Drama is represented on the campus by the Roister Doisters open to all four-year students interested in the art of the theater, and the University players open to those students who have shown outstanding ability, effort, and interest in some phase of dramatics through the Roister Doisters. The women's Drill Team accompanies the band at all home football games. All academic activities are supervised by the Academic Activities Board composed of alumni, faculty, and students, and find recognition in the annual award of gold and silver medals.

INTER-COLLEGIATE ATHLETICS

The University is represented in inter-collegiate athletics by teams in all the leading sports including football, soccer, cross country, basketball, swimming, indoor track hockey, rifle and

pistol, baseball, track, tennis, and golf. General policies governing athletics are directed by the Joint Committee on the Inter-Collegiate Athletics composed of alumni, faculty, and students.

PROFESSIONAL CLUBS

There are numerous professional clubs established in connection with the various major courses of study. These clubs stimulate the students' professional interests in their chosen subject-matter fields and afford opportunity for discussion of technical subjects of mutual interest.

ALUMNI ASSOCIATION

The Associate Alumni is the general organization of the Alumni, men and women, of the University of Massachusetts. The association maintains headquarters at Memorial Hall, erected by Alumni and friends in honor of those men of the University who died in World War I.

It publishes a monthly bulletin as the alumni publication of the University and, periodically, an Alumni Directory.

The Associate Alumni strives to advance the interests and welfare of the University of Massachusetts in every way possible and cooperates in its educational work.

The organization is presently engaged in extending the facilities of Memorial Hall as a memorial to those men who died in World War II.

Under alumni sponsorship, 10 self-liquidating dormitories are being built on campus.

The governing body of the Associate Alumni consists of its officers and a Board of Directors. Four directors are elected each year and serve a term of four years. All graduating seniors become members of, and contributors to, the Association at graduation, according to a tradition set by the Class of 1940.

HONORS, PRIZES, AWARDS

SCHOLARSHIP HONORS

DEAN'S SCHOLARSHIP GROUPS.—At the beginning of each semester a list is posted of those students who during the previous semester made a general average of 80 per cent or better. Three groups are recognized: those between 90 and 100; those between 85 and 90; and those between 80 and 85.

DEPARTMENTAL HONORS.—A student who has shown outstanding promise within some department and has maintained a general

scholastic average of 80 percent or better is permitted to apply for the privilege of registering for departmental honors.

If his application is accepted by his department and the Honors Committee, he is allowed to pursue a course of independent study within the department of his choice throughout his senior year. This may include intensive reading, investigation, or laboratory work in connection with some problem that he chooses for his consideration. The objective is to create initiative and the power of independent investigation, and to develop the spirit of research.

Although the student is responsible for his undertaking, he is encouraged to consult with his department in regard to his work should the need arise. At the close of his study the student presents a thesis covering his investigation. In addition he is required to appear for an oral examination. If by the excellence of his work he satisfies all the requirements of his department and the Honors Committee, his name will appear on the commencement program for receiving honors in the field of his specialization.

SCHOLASTIC PRIZES

PHI KAPPA PHI AWARD FOR SCHOLARSHIP.—Massachusetts Chapter of Phi Kappa Phi, honorary scholarship society, offers an award of \$50 for outstanding work in scholarship. This is given to some member of the senior class at the opening of school in the fall. The award is based on the record of the first three years.

THE BURNHAM PRIZES.—These were made possible through the generosity of Mr. T. O. H. P. Burnham, of Boston. Prizes of \$15 and \$10 are awarded to those students delivering the best and second best declamations respectively in the Burnham contest. The preliminary contests are open under certain restrictions to freshmen and sophomores.

THE FLINT PRIZES.—The Flint Oratorical Contest was established in 1881 by a gift of the late Charles L. Flint, a former president of the College. After his death the prizes were continued by college appropriation. Prizes of \$30 and \$15 are awarded as first and second prizes respectively to those two students delivering the best orations in this contest.

THE HILLS BOTANICAL PRIZE.—This is given through the generosity of Henry F. and Leonard M. Hills, of Amherst, for the first and second best herbaria. Competition is open to members of the senior, junior and sophomore classes. First prize is \$20, second prize, \$15.

THE BETTY STEINBUGLER PRIZE IN ENGLISH.—This prize was endowed by John L. Steinbugler, of New York City, in honor of his daughter Elizabeth Steinbugler Robertson, a graduate of this College in 1929. It is awarded to a woman in the junior or senior class who has written the best long paper on a subject of literary investigation in a course in English during the year.

MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE PRIZES.—Three prizes of \$25, \$15, and \$10 are awarded to those senior students who are judged to have made the best records in the theoretical and practical work in agriculture required in their course of study, and in the special written and oral examination prepared for this award.

ATHLETIC AND ACADEMIC PRIZES

THE ALLAN LEON POND MEMORIAL MEDAL.—This medal is awarded for general excellence in football, in memory of Allan Leon Pond, of the class of 1920, who died February 26, 1920. He was a congenial companion, a devoted lover of The Alma Mater, a veteran of World War I, a fine all-round athlete and a true amateur. He would rather win than lose, but he would rather play fair than win. He has been characterized as a typical student of the University.

THE WILLIAM T. EVANS MEMORIAL TROPHY.—This trophy is given each year to that member of the varsity football team who through his sportsmanship, football ability, character and personality has thus exemplified the character and spirit of the person in whose memory this memorial trophy is dedicated. The trophy is dedicated to the memory of William T. Evans, a former member of the class of 1942, who died December 9, 1941. This trophy is presented annually by the class of 1942.

THE THOMAS E. MINKSTEIN MEMORIAL AWARD.—This award is made by the class of 1931 in memory of their classmate who died July 16, 1930, while he was captain-elect of football. The award is given to one of the outstanding men in the junior class who has as nearly as possible attained those standards of athletics, scholarship and leadership set by him whose memory this award honors.

THE GEORGE HENRY RICHARDS MEMORIAL CUP.—This cup is awarded annually to the member of the basketball team who shows the greatest improvement in leadership, sportsmanship, and individual and team play during the year. It is in memory of George Henry Richards, of the Class of 1921, who died suddenly while a student at the College.

THE JOSEPH LOJKO MEMORIAL PLAQUE.—This plaque is presented to a senior who must be a letter man, have a satisfactory scholastic record, and show those qualities of enthusiasm and cooperation which make for leadership. It is awarded in honor of Joseph Lojko, of the Class of 1934, an outstanding athlete who died while a senior in college.

THE SAMUEL B. SAMUELS BASKETBALL CUP.—This cup is presented annually in the name of Samuel B. Samuels, of the Class of 1925, who was an outstanding basketball player during the early years of basketball as a varsity sport at the University. The trophy is awarded to that letter man who is a regular member of the varsity basketball team and who has performed with excellence during scheduled varsity games.

THE E. JOSEPH THOMPSON MEMORIAL TROPHY.—This baseball trophy is given by Thomas Thompson in memory of his brother, E. Joseph Thompson, who graduated from Massachusetts State College in 1932. He was president of the student Senate, a varsity letter man in football and baseball, and an outstanding campus citizen. The award goes to that member of the varsity baseball team who best exemplifies the best characteristics of the sport each year.

ACADEMICS CONSPICUOUS SERVICE TROPHY.—This trophy is awarded annually to that student who has made the most unique contribution to the academic activities during the year.

ACADEMIC MANAGER'S PRIZE.—Fifty dollars is awarded annually to that Academics manager who fulfills his routine duties most efficiently.

MILITARY HONORS AND AWARDS

Competed for yearly and presented at the Final Military Review

DESIGNATION OF DISTINGUISHED MILITARY GRADUATES

THE SONS OF THE LOYAL LEGION TROPHY.—Awarded annually by the Massachusetts Chapter of the Sons of the Loyal Legion to the Senior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

THE MILITARY DEPARTMENT TROPHY.—Awarded annually by the Military Department, University of Massachusetts, to the Jun-

ior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a sterling silver goblet and is given to the individual to keep in his permanent possession.

THE AIR FORCE ASSOCIATION MEDAL.—Awarded by the Air Force Association to the outstanding Air ROTC cadet in the First Year Advanced Course. This award is based on academic and military scholarship grades and individual characteristics of leadership.

THE ELIZABETH L. McNAMARA TROPHY.—Awarded annually by Mrs. Elizabeth L. McNamara, a trustee of the University for many years, to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a permanent plaque with winner's name inscribed thereon.

THE JOHN C. HALL TROPHY.—Awarded annually to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a loving cup donated by the class of '02 with the winner's name inscribed thereon, and a sterling silver goblet, awarded by Mr. John C. Hall, is given to the individual to keep in his permanent possession.

THE AMHERST ROTARY CLUB TROPHY.—Awarded annually by the Amherst Rotary Club to the cadet ranking No. 1 in scholarship and military efficiency in the first year basic course. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

QUALIFICATION BADGES U. S. ARMY.—Awarded to cadets who have qualified with the necessary scores with either Rifle or Pistol.

DISTINGUISHED MILITARY GRADUATE.—Each year the USA and USAF appoint cadets to the regular Army and Air Force from a group of Distinguished Military Graduates who have been selected by the Military Department. These cadets are chosen on the basis of outstanding qualities of Military Leadership and Scholarship which have been displayed during the Advanced Course R.O.T.C.

ADMISSION TO THE UNDERGRADUATE COLLEGE

Those interested in applying for admission to the University of Massachusetts should write to the Registrar to obtain an application form. The first two pages of the application form are completed by the candidate himself. The last two are completed by high school or preparatory school authorities, who mail the application form directly to the Registrar of the University.

Because of the increasing interest in college level study and the consequent increase in the number of applications, candidates are advised to file their applications early in the senior year of high school and certainly not later than March 1 of the year in which they plan to enter.

Preference is given to residents of Massachusetts, but the University also admits students from other states. A few students from foreign nations are also admitted. Candidates for the freshman class are accepted only for the opening of the college year in September. Students enrolled in other colleges may apply for admission to the Summer Session, but admission to the Summer Session does not necessarily constitute regular admission and enrollment in the undergraduate program of the University.

The University admits young men and women to the freshman class chiefly on the basis of character and scholarship. The general record must indicate promise of success and ability to profit by the opportunities which the University has to offer. Due regard is given to special achievement in specified subject matter fields.

SUBJECT REQUIREMENTS FOR ADMISSION

The subjects of preparatory study required for admission call for the satisfactory completion of a four-year high school course, or its equivalent, and are stated in terms of units. A unit is the equivalent of at least four recitations a week for a school year. High school graduation alone is not sufficient. The applicant's record must indicate capacity for handling the quality of scholastic work which the University has established as its standard of achievement.

Sixteen units of secondary school work must be offered, selected according to the following requirements:

Algebra	1 1/2
Plane Geometry	1
English	4
Foreign Language (2 years of 1 language)	2
U. S. History	1

The remaining units are elective and may be selected from the following subject matter:

- a. Mathematics
- b. Science
- c. Foreign Language
- d. History and Social Studies
- e. Free electives (not more than four units)

Free elective subjects are those not included in groups a-d, as for example: Music, Art, Drawing, Typewriting, Aeronautics, Agriculture, Home Economics, etc. Such free electives are allowed in order that the student who wishes may have some opportunity to elect other high school courses, while at the same time covering the fundamental requirements for college work.

Students planning to pursue an engineering curriculum should offer two years of Algebra, one of Plane Geometry, and one-half year each of Trigonometry and Solid Geometry. Chemistry and Physics are also advised. Those deficient in the Mathematics should plan to cover it during the summer prior to entrance or expect to take five years to complete the college course.

In high schools organizing agricultural club work under the supervision and rules of the Junior Extension Service of the University, one credit is granted for each full year of work approved by the State Leaders.

Candidates of exceptional ability and promise may be considered for admission even though all the prescribed courses were not included in their high school program.

METHODS OF ADMISSION

Plan A. Students applying from accredited schools and making the college recommendation grades of their school in accordance with the subject requirements listed above are considered certified for admission.

Superior graduates of Vocational Schools of Agriculture in Massachusetts and Vocational Agricultural Departments in Massachusetts High Schools may be accepted for the Degree of Bachelor of Vocational Agriculture provided:

a. They are unqualifiedly recommended by the Vocational Division of the Department of Education as bona fide Vocational Graduates with superior ranks; and

b. They can present at least 16 units of certified entrance credits, approved as to quality and quantity by the State Department of Vocational Education.

Plan B. Students who are not fully certified will be required to take the Scholastic Aptitude test of the College Entrance Examination Board. In some cases three Achievement Tests will be required also. The applicant will be informed what tests are to be taken as soon as his application is received or at the time of his personal interview. Candidates will ordinarily take these examinations in the spring of their senior year. Application blanks and a bulletin of general information concerning the tests may be obtained from the College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey.

The University realizes that although almost all students will qualify under either Plan A or B, there will be a few promising candidates who, for one reason or another, are unable to meet fully the subject requirements for enrollment. Such applicants are requested to present their individual problems to the Registrar in order that the Admissions Committee may outline for them what must be done to qualify for enrollment.

ADMISSION TO ADVANCED STANDING

A limited number of students from approved colleges may be admitted on transfer to advanced standing. Since applicants for such admission usually exceed the number that can be accepted, they are placed on a competitive basis. Acceptance will thus depend upon recommendations and quality of record.

Candidates desiring to transfer to the University of Massachusetts from other institutions should write to the Registrar for a regular application form, inasmuch as a student applying for transfer must first of all be able to meet the entrance requirements of the University. Such candidates should also submit the following:

a. A letter outlining reasons for wishing to transfer and describing briefly the type of major work to be followed if accepted for admission.

b. An official transcript of entrance credits and college record to be sent by the Registrar of the College from which he wishes

to transfer. This should be forwarded as soon as possible after the close of the semester preceding the one for which transfer is sought.

At least one consecutive year of work in residence is required of any transfer student desiring to be recommended for the Bachelor's degree.

SCHOOLS AND DIVISIONS OF INSTRUCTION

Resident instruction is organized on a school and divisional basis. In the undergraduate college there are six schools and two divisions. The schools are: School of Liberal Arts, School of Science, School of Home Economics, School of Engineering, School of Agriculture and Horticulture, School of Business Administration.

The Divisions are Physical Education and Military Science.

This section of the catalogue presents the opportunities for study in these schools and divisions, and describes the curricula available in each. Brief descriptions are given of the major work offered in the several departments and the special curricula which cut across departmental lines. The adviser in charge of each major is indicated. This adviser will aid the student in planning his program of studies and give him more complete information in regard to the qualifications for and opportunities in his particular field. For a description of specific courses refer to the Directory of Courses.

SCHOOL OF LIBERAL ARTS

FRANK PRENTICE RAND, *Acting Dean*

The School of Liberal Arts comprises the departments of Education, English, German, Romance Languages, Economics, History and Government, Sociology, Philosophy, Psychology, and Fine Arts. It offers a broad liberal program of studies aimed at giving the student a general cultural education in addition to professional training in certain fields. It also offers required and elective courses for students in other schools.

Students who satisfy the Liberal Arts requirements of the freshman and sophomore years and who as juniors and seniors complete the requirements for specialization in one of the several departments of the School qualify for the A.B. degree. However, students specializing in the departments of Psychology and Education may qualify for the B.S. degree by electing fifteen junior-senior credits in the physical and biological sciences.

Those enrolled in this School are required to take fundamental courses in the humanities, mathematics, and the physical, biological, and social sciences in the first two years. As a junior each student selects a major from the following: Economics, Government, Edu-

cation, Psychology, History, Sociology, English, French, Modern Languages, German, Fine Arts, and Philosophy.

CURRICULA IN LIBERAL ARTS

The courses for the first two years are largely prescribed. Each student therefore follows a fairly uniform program of studies until he begins his specialization.

FRESHMAN YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 7	3	Mathematics 8 or 10	3
Chemistry or Biology (Botany and Zoology)	3	Chemistry or Biology (Botany and Zoology)	3
French, German, or Spanish	3	French, German, or Spanish	3
History 5	3	History 6	3
Physical Education 7 (women)	2	Physical Education 8 (women)	2
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Hygiene (women)	1		

SOPHOMORE YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Survey of Lit.	3	English 26, Survey of Lit.	3
¹ Economics 25 or Psychology 26	3	Psychology 26 or Economics 25	3
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 33 (men)	1

One of the following Sciences each semester:

Bacteriology 31, 31A	4	Zoology 35	3
Botany 25, 26	3	Mathematics 29, 30	3
Chemistry 29, 30	4	Physics 25, 26	4
Chemistry 31, 32	3	Entomology 26	3
Geology 27, 28	3		

Two electives from the following each semester:

French 7, 8, 29, 30, 31, 32	3	Spanish 1, 2	3
German 25, 26	3	Economics 26	3
Government 25, 28	3	Psychology 28	3
History 31, 32	3	Sociology 28	3

¹ If Economics is taken in the first semester, Psychology will be elected in the second and vice versa.

JUNIOR-SENIOR CURRICULA IN LIBERAL ARTS

Major work is available in the following departments during the last two years.

ECONOMICS

P. L. GAMBLE, *Adviser*

In Economics the aims are twofold: (1) to give the student an understanding of economic theory and of the application of economics to the organization of society; (2) to provide students

with the elementary training necessary for further study of economic and business problems.

The department requires that all majors irrespective of the career desired take the following courses: Economics 73, 79, Finance 53, Accounting 25, and Agricultural Economics 79 or Mathematics 62. In addition, each student must select an additional 12 credit hours of work from the Economics curriculum. No major student is permitted to take more than 36 junior-senior credit hours of economics, agricultural economics and business administration courses. In choosing elective courses students are urged to select courses in the humanities and preferably some from the allied fields of history, philosophy, psychology, and sociology. Those intending to major in Economics should elect Economics 26 in the sophomore year.

For the majors in the Economics department, there are offered courses which may be combined to serve as preparation toward a number of different careers. Among others, possible careers in the following fields are open:

Banking and Finance	Public Utilities
Government Service	Social Security
International Trade	Statistics
Labor and Personnel Relations	Transportation and Communication

EDUCATION

A. W. PURVIS, *Adviser*

The department seeks to utilize the forces of the university to prepare teachers for secondary schools and through its graduate offering to prepare administrators and specialists in the various phases of public education. Its teacher-training program is based upon the assumption that secondary school teachers should have a broad liberal education, considerable mastery of the subject or group of subjects to be taught, and professional courses which should lead to a knowledge of the pupils to be taught, familiarity with the problems to be met, and new meaning to the subjects of instruction.

In order to realize these aims, all students who contemplate teaching or other school work as a career should register early, in their freshman year if possible, with the Department of Education although their work there does not begin until the junior year. Admission to either a minor or a major in Education will be determined largely by a composite rating based on scholarship as deter-

mined by university grades and success in the beginning course in History of Education, on the percentile rank of standard placement tests, and on personality ratings by members of the staff.

Currently there are two avenues leading toward a career of teaching in the secondary schools. The student may (1) major in Education or (2) minor in Education and major in subject-matter field to be taught.

THE MAJOR IN EDUCATION. This opportunity is intended for those students who desire to teach in one or more fields and who are seeking (1) a more diversified program than is possible under a subject-matter major and (2) a much wider opportunity to do practice teaching. Normally the student in his four years will schedule approximately thirty hours in one subject field, eighteen in a second subject field and eighteen in Education. The remaining hours will be distributed among supporting courses and courses in general education. The student should register early, in the freshman year, if possible, in the Department of Education and should apply for the major in Education at the end of the sophomore year. He should elect History of Education 51 in the first semester of the junior year and candidates will be chosen for the major during that semester.

The following general outlines are given as examples of how the major in Education would apply to various teaching programs.

TEACHING ENGLISH AND HISTORY

First and second years—satisfy requirements of the School of Liberal Arts; elect Government 25, History 31, 32.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. English 18 hours, History 6 hours, general 18-21 hours.

TEACHING MATHEMATICS AND PHYSICS

First and second years—satisfy requirements of the School of Science; elect Mathematics 29, 30, Physics 25, 26.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. Mathematics 12 hours, Physics 12 hours, general 18-21 hours.

TEACHING CHEMISTRY AND BIOLOGY

First and second years—Satisfy requirements in the School of Science; elect Chemistry 29, 30, Mathematics 29, 30, Botany 25, 26.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. Chemistry 15 hours, Botany, Zoology 12 hours, general 15-18 hours.

THE MINOR IN EDUCATION. Training programs for students who desire to teach and to major in any of the arts and sciences

or in agriculture, home economics, physical education, or extension are as follows:

TEACHER-TRAINING IN THE ARTS AND SCIENCES. The student should register early in the Department of Education and should usually elect prerequisite course, History of Education 51, in the first semester of the junior year. If the student is then accepted for a minor in Education he will normally take Education 52 and 88 in the second semester of the junior year, Education 53 and 83 in the first semester of the senior year and Education 85 in the last semester of the senior year. Opportunity for a restricted amount of practice teaching is available under Education 85 if the student's schedule permits. (Tuesday and Thursday should be free for this work.) A selected few from this group may be chosen each year for the One-Semester Plan if it is offered.

TEACHER-TRAINING IN AGRICULTURE. (Professor Oliver, adviser.) By a cooperative agreement with the State Division of Vocational Education, persons otherwise qualified may prepare to teach vocational agriculture by the satisfactory completion of Education 72, 73, and 75. Education 52 is also recommended. To insure a desirable range of preparation, students who contemplate vocational teaching should consult (early in the freshman year if possible) Professor Oliver and the State Supervisor of Agricultural Teacher-Training. A vocational teacher-training certificate is awarded by the Vocational Division to those who fully qualify.

TEACHER-TRAINING IN HOME ECONOMICS. (Professor Piatt, adviser.) These students will major in home economics and elect Education 51, 53, and 83, Home Economics 81 and 83, Psychology 55. A selected few may be chosen each year for the One-Semester Plan.

TEACHER-TRAINING IN PHYSICAL EDUCATION. (Professor Gore, adviser.) These students will major in physical education and elect at least eighteen hours of the academic field to be taught. They should elect Education 51, 52, 85, and 88, Physical Education 54, Psychology 55.

TEACHER-TRAINING IN EXTENSION. (Mr. Dayton, adviser.) The student will major in some branch of agriculture, horticulture (see page 108) or home economics (see page 135) and should elect courses in economics, speech, and journalism. They should elect Education 61 and 66.

ENGLISH

F. P. RAND, *Adviser*

The department of English offers courses in English composition and literature and in speech. Students majoring in this department must conform to the institutional and school requirements for freshman and sophomore years, and in choosing sophomore electives should include two semesters of modern language and one semester of English history.

The courses in English are intended to enable students to express themselves effectively and to appreciate humanistic values and the ideals of English-speaking people throughout their history. They also offer an appropriate, and in some instances an adequate, classroom training for work in such fields as teaching, authorship and editing.

The student must earn 30 credits in elective courses in English. However, for six of these he may substitute elective courses in other languages or speech.

JOURNALISM

The journalism courses are designed to provide professional guidance for students interested in newspaper work or related fields. Such students are advised to compete for membership on the college newspaper while freshmen or sophomores, take the introductory course (Journalism 85) as juniors, and elect other courses in social science and literature. Selected seniors will be provided a limited amount of actual professional experience.

FINE ARTS

J. ROBERTSON, D. ALVIANI, *Advisers*

The department of fine arts is to a certain extent interdepartmental and interscholastic, including that work of various departments which is artistic in their contributed courses. For the present the aim of the department is to bring together art, music and other courses in self-expression until the growth of the work permits the development of several special departments. The work in art is basic in its approach to design, drawing and painting. The art appreciation courses are non-professional in scope but provide a better understanding of the arts, in history and quality. The courses in music furnish an understanding of the history and interpretation of music, provide basic professional theory and afford some opportunities for performance. In addition, the department has made arrangements with well-qualified private teachers to offer

instruction, without course credit, in voice and instrumental music to individuals or class groups.

The student majoring in fine arts is required to elect not less than 28 nor more than 30 credits from among the courses listed below. At least 15 credits must be from Group A or from Group B, and the student's adviser is assigned on this basis.

A	B	C
Music 25, 26	Art 33, 34	Home Ec. 31
Music 51, 52	Art 27, 28	Home Ec. 62
Music 61, 62	Art 31	Land Arch. 51
Music 75, 76	Art 75	Flori. 58
English 81	Land Arch. 83, 84	Phys. Ed. 61, 62, 81, 82
Speech 89	Art 77, 78	

GERMAN

A. N. JULIAN, *Adviser*

The courses in German are intended to give a practical knowledge of the language for the purpose of wider reading, research, and oral communication.

During the junior and senior years each student will complete not less than 24 and not more than 30 credits in the junior-senior German courses. Students planning to use the language professionally are also urged to supplement their courses here with a summer session at an approved school of German.

HISTORY AND GOVERNMENT

HISTORY

T. C. CALDWELL, *Adviser*

The courses in history are intended to impart an understanding of the people of the world and their problems through an analysis of man's development in the past. A major in this field should provide the student with a broad cultural background and a basis for good citizenship. History may have special value for the following groups:

(1) Those who plan to teach history or the social studies.

(2) Those who plan careers in which considerable knowledge of history is desirable. These might be in fields such as law, government service, journalism, and library work.

Students who wish to major in this department are expected to conform to the institutional and divisional requirements of the freshman and sophomore years, including History 5 and 6. In

choosing sophomore electives they should include two semester courses in history.

In addition to the above courses, students are expected to take a minimum of 24 credits in the elective junior and senior courses. Government 25 should be elected in the junior year if not taken as a sophomore elective. History 59 and 60, American History, and History 91 and 92, Historical Bibliography are required.

GOVERNMENT

W. A. MITCHELL, *Adviser*

The work in government aims to give the student an understanding of the principles of government and their application to the organization of society, and to provide him with elementary training necessary for positions in government service or further study on the graduate level. It thus may be considered either as pre-law or pre-professional work, in addition to its general cultural utility.

Majors in the field should elect Government 25 and 28 in their sophomore year. In the junior and senior years a minimum of eight additional courses in government is recommended; these may be elected from the following: Government 52, 61, 62, 63, 64, 65, 66, 67, 68, 93, 94, or History 53. In addition eight supporting courses in other social sciences are recommended; these may be chosen from the fields of history, economics, sociology, or psychology. The remaining junior-senior courses should be chosen from the fields of languages, literature, philosophy, art, or music.

PHILOSOPHY

H. N. GLICK, *Adviser*

Philosophy in general attempts to offer a comprehensive understanding of the universe and makes an effort to decide what one should do while living in it. The distinctive purpose of the courses in philosophy is to concentrate on methods of inquiry, standards of thought, search for values in personal and community life, and the analysis of artistic expression and standards of criticism.

The student majoring in this subject will complete a minimum of 21 credits in junior-senior courses in philosophy. A wide range of supplementary courses is advised, among which the following are acceptable: Chemistry 88, Government 52, 66, Education 51, English 73, 75, 79, 80, Art 75, 77, 78, Music 51, 52, History 61, 63, 75, Mathematics 72, Psychology 61, 90, French 51, 52, Sociology 53, 82.

PSYCHOLOGY

C. C. NEET, *Adviser*

The courses in the psychology department are designed (1) to impart an understanding of behavior and the application of this knowledge to problems of human adjustment; and (2) to give preparation for professional work in psychology and related fields.

Careers open to psychology majors include: teaching and research, guidance, psychometrics, personnel and industrial work, child welfare, abnormal and clinical psychology, opinion polling, and government service. Additional training is required for certain of these careers.

Students planning to major in psychology should elect Psychology 26 and Psychology 28 in the sophomore year. In the junior and senior years majors are advised to take a minimum of 24 credits in psychology. Courses 51 and 90 are required. As broad a cultural background as major programs will permit is advised.

Majors planning careers primarily in experimental and physiological psychology should plan to take one or more courses during their four years in chemistry, mathematics, physics, and zoology. Those planning careers in abnormal and clinical psychology and in child welfare should elect specified courses in education, English, home economics, sociology, and zoology; while those planning careers in psychometrics, guidance, personnel and industrial work, and government service should take certain courses in business administration, in economics, education, industrial engineering, and sociology.

ROMANCE LANGUAGES

Two curricula are offered: French and Modern Languages.

FRENCH

C. F. FRAKER, S. C. GODING, *Advisers*

The courses in French are intended to give a rounded knowledge of the language for the purpose of wider reading, oral communication and research, leading to a better understanding of the art and the science of the nation. Students majoring in French are required to earn 30 junior-senior credits in the department. Those preparing to use the language professionally are usually urged to supplement their courses here with a summer in an approved school of language.

MODERN LANGUAGES

C. F. FRAKER, *Adviser*

This is a distributed major. The requirements are 30 credits in modern languages, including at least 12 in advanced courses in one of them, and not including the 12 required of freshmen and sophomores.

SOCIOLOGY

J. H. KORSON, *Adviser*

The courses in sociology are planned with two aims in view:

(1) To give the student an understanding of the factors which influence men in their activities and interests as members of society, and

(2) To prepare those students who are interested in teaching social studies at the high school level; or those students interested in careers with government agencies; or in careers as social workers with state or private agencies to gain the pre-professional courses necessary before embarking on such careers. Most agencies require some work on the graduate level before full-time employment is obtained, while others offer in-training opportunities to graduate majors in sociology.

SOCIAL WORK

Students interested in pre-professional training in social work are advised to follow the curriculum in sociology. The American Association of Schools of Social Work indicates that the pre-professional subjects most closely related to professional work in this field are economics, political science, psychology, and sociology. The Association recommends that prospective students of social work or social administration take not fewer than 12 semester hours in one of these subjects while taking less in others. It also recognizes the value of courses in biology, history, English, as well as other subjects contributing to a broad cultural background for the student.

Students who expect to major in sociology are advised to elect freshman biology and Zoology 35. At least 24 junior-senior credits in sociology are required. Students are required to take Sociology 53 and 82 and are urged also to select courses in economics, history, government, and psychology.

SCHOOL OF SCIENCE

C. P. ALEXANDER, *Dean*

The School of Science includes the Departments of Bacteriology and Public Health, Botany, Chemistry and Chemical Engi-

neering, Entomology, Zoology, Geology and Mineralogy, Mathematics, and Physics. The programs of study outlined by these departments lead to the degree of Bachelor of Science.

The School, through departments, provides professional and pre-professional training for those students planning to enter the fields of science. Courses in science required by, or of interest to, students enrolled in other divisions are also available.

Each department offers the usual requirements of undergraduate specialization in its particular field. These offerings enable the students to enter the fields of science and to continue to study for advanced degrees. In addition, special curricula are provided to meet the needs of special groups of students. These include curricula for pre-medical, pre-dental and pre-veterinary students, and for those who plan to train as laboratory technicians and to enter public health service.

The curricula in the School of Science are planned to provide a broad and cultural education, as well as opportunity for specialized training. To this end the work of the first two years is largely prescribed, specialization occurring in the junior and senior years. The concentration of the junior and senior years gives students as high a proficiency in their fields of specialization as is possible without sacrificing the objectives and requirements of a well-rounded education.

CURRICULA IN SCIENCE

FRESHMAN YEAR

Freshman work in the School of Science consists of definitely required subjects resulting in a fairly uniform program of studies for all students.

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
†Mathematics 7	3	†Mathematics 8 or 10	3
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Chemistry 1, General	3	Chemistry 2 or 4, General	3 or 4
†Biology (Botany 1 or Zoo. 1)	3	†Biology (Botany 1 or Zoo. 1)	3
German 1 or 5, or French 1, 5, 15	3	German 2 or 6, or French 2, 6, 16	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
Hygiene (women)	1		

† Chemical engineering majors take Mathematics 5 and 6, and substitute Mechanical Engineering 1 and 2 for Biology.

SOPHOMORE YEAR

In the sophomore year each student must take the required English, a Social Science, a Science, and two elective courses under the direction of his adviser.

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Survey of Lit.	3	English 26, Survey of Lit.	3
Economics 25 or Psychology 26	3	Economics 25 or Psychology 26	3
¹ Science	3	Science	3
² Electives	6	Electives	6
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ Elect one of the following:

	<i>Credits</i>		<i>Credits</i>
Bacteriology 31, 31A	4	Entomology 26	3
Botany 25, 26	3	Geology 27, 28	3
Chemistry 29, 30	4	Mathematics 31, 32	4
Chemistry 31, 32	3	Physics 25, 26	4
Mathematics 29, 30	3	Zoology 25, 35	3

² To consist of additional sciences selected from the above list, or a Science and a Language. Chemical engineering majors also take Civil Engineering 34. In selecting the required and elective courses in Science and Language, students should be guided by the recommendations for Sophomore work given under the description of Junior-Senior curricula that follows.

JUNIOR-SENIOR CURRICULA IN SCIENCE

Major work is provided in the following departments. In addition, there are other special curricula both pre-professional that cut across departmental lines. Students desiring complete information in regard to the opportunities and program of study in each curriculum are expected to consult the adviser in charge.

BACTERIOLOGY AND PUBLIC HEALTH

The department offers three curricula: one in Bacteriology, one in Public Health, and the other in Medical Technology.

BACTERIOLOGY

L. A. BRADLEY, *Adviser*

The courses in bacteriology have been planned to furnish (1) a general training in this field for college students; (2) specialization for those contemplating a professional career in bacteriology.

Majors in bacteriology should elect the following in the sophomore year: Chemistry 29, 30; Physics 25, 26; Bacteriology 31, 31A; Zoology 35. The physics may be deferred until the junior year to allow for additional language study.

Juniors and seniors must take Chemistry 51, 52, and 79; and Botany 66 and Zoology 84 in addition to the required work in Bacteriology and Public Health.

PUBLIC HEALTH

L. A. BRADLEY, *Adviser*

Through the cooperation of several departments of the university and the Massachusetts Department of Public Health, cur-

ricula are provided for (1) a limited number of students interested in the many phases of public health service for which graduate work in medical or engineering schools is not essential; and (2) students planning graduate work in sanitary engineering.

Particular attention will be given to the training of sanitarians, district sanitary officers, food and milk inspectors, water and sewage treatment plant operators, technicians for public health laboratories, and agents for local boards of health. Students planning graduate work in sanitary engineering must also take Mathematics 29 and 30 (calculus) before the end of their junior year.

The following curriculum is required of all upperclassmen:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Public Health 62, Sanitation	3
Public Health 61 Sanitation	3	Bacteriology 90, Sanitary	3
Chemistry 31 or 51, Organic	3-4	Chemistry 32 or 52, Organic	3-4
*Electives	6	*Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agr. Econ. 79, Statistics	3	Public Health 86, Field	
Public Health 84, Administration	3	Studies in Sanitation	3
*Electives	9	Public Health 88, Epidemiology	
		Communicable Disease	
		Control	3
		*Electives	10

* During the junior-senior years, students elect a minimum of 24 semester credits from the following:

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Hus. 53, Elements of Meat Packing	3	Bact. 82, Food	3
Chem. 63, Water and Sewerage	3	Public Health 64, Planktology	3
Govt. 61, Public Administration	3	Bot. 66, Industrial Mycology	3
Mech. Engineering 1, Drawing	3	Dairy Ind. 52, Market Milk	4
Civil Engineering 77, Water Supply	3	Govt. 62, Public Administration	3
Food Tech. 75, Food Preservation	3	Civil Engin. 78, Sewerage	3
Forestry 51, Management of Water Sheds	3	Ent. 60, Pest Control	3
Geol. 27, Physical Geology	3	Ent. 74, Medical Ent.	3
Vet. Sci. 78, Pathology	3	Food Tech. 92, Food Analysis	3
Zool. 69, Parasitology	3	Home Ec. 52, Nutrition	3

CURRICULUM IN MEDICAL TECHNOLOGY

R. L. FRANCE, *Adviser*

This curriculum provides a broad fundamental training for young women who plan to qualify as medical technologists. The program more than meets the basic collegiate requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists.

Through an agreement between the Bingham-Rockefeller laboratories and the university, each year a certain number of graduates of the course will be accepted as technicians in laboratories supervised by the Bingham-Rockefeller foundation. There the technicians will receive further theoretical and practical training so that after a year they will be qualified to take the examination for the Certificate of Medical Technologist. A satisfactory living salary is paid the technician during the year of training and unusual opportunities for advancement are offered.

Also, through the cooperation of the Bingham-Rockefeller laboratories, the university placement service, and the department of bacteriology and public health, graduates other than those accepted by the Bingham-Rockefeller foundation will be placed in laboratories certified by the American Society of Clinical Pathologists as qualified to train medical technologists.

Students taking this curriculum should complete the following sciences in the sophomore year: Bacteriology 31A; Chemistry 29, 30; and Zoology 35.

The junior-senior program follows:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Bacteriology 52, Advanced	3
Chemistry 31 or 51, Organic	3-4	Chemistry 32 or 52, Organic	3-4
Public Health 61, Sanitation	3	Public Health 62, Sanitation or	
Zoology 51, Microtechnique	3	Public Health 88, Commu-	
*Electives	3	nicable disease control	3
		*Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 81, Applied	3	Bacteriology 82, Applied	3
Bacteriology 85, Serology,		Bacteriology 92, Clinical	3
Immunology	3	Chemistry 80, Clinical	3
Zoology 69, Medical parasitology	3	*Electives	6
*Electives	6		

* During the junior-senior years students elect 21 credits from the following:

History, required course	Zoology
Chemistry 79, Physiological	Physics 25, 26 Introductory
Chemistry 82, Qualitative organic	Liberal Arts

BOTANY

T. T. KOZLOWSKI, *Adviser*

The purpose of the courses in botany is primarily to provide a thorough background for specialization in the science, and secondarily to support and supplement the work of other fields in which knowledge of plant life is held to be important. Certain

courses should likewise prove of interest and value to the general student.

Those who wish to specialize in botany will find here an ample field and an adequate opportunity for advanced undergraduate study. Post-graduate training, often with provision for financial aid, is available in most graduate institutions, and many teaching, research and industrial positions in schools, and colleges, experiment stations, federal and state services and private enterprise are open to the trained botanist.

The curriculum offers to the student an opportunity to acquire either a broad general knowledge of botany, or to devote himself to more extensive study in one of the major divisions of the science, such as plant morphology and taxonomy, plant physiology, mycology and plant pathology. Under the direction of his adviser each student selects a program of courses in botany and other sciences, humanities and arts which seems best adapted to his particular botanical objectives.

Specialization in botany assumes the satisfactory completion of certain basic and supporting courses prior to the junior year. These include Botany 1, 25 and 26; Chemistry 1, 2 and 29; and a modern language. Two years of German are advised.

The junior-senior program requires that courses in botany to the amount of 15-30 credits be chosen under the guidance of the adviser. He will also make recommendations in regard to electives.

CHEMISTRY AND CHEMICAL ENGINEERING

CHEMISTRY

W. S. RITCHIE, *Adviser*

The objectives in chemistry are to give the student an understanding of the subject which will enable him to appreciate the relation of chemistry to other sciences, and to industry, and to provide training for those who intend to become teachers and workers in the allied sciences, and for those who wish to go on to graduate study and a professional career in chemistry. Completion of the course in chemistry fits the student for positions in the chemical industries and related fields as well as in the agricultural industry, for employment in state and Federal agricultural experiment stations and commercial laboratories and for teaching.

Students planning to major in chemistry should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 29, 30; and Physics 25, 26.

Work for the junior and senior years includes required courses in analytical, organic, and physical chemistry and the possibility of election in related and supporting fields. While the major is arranged to provide general and fundamental training in the science, work in the humanities and social sciences is also recommended. The desirability and necessity of a well-rounded education must not be overlooked.

CHEMICAL ENGINEERING

E. E. LINDSEY, *Adviser*

The courses in chemical engineering are designed to give the student a good background and thorough understanding of chemical engineering principles. The student studies the fundamental principles first and then proceeds to apply them in the solution of comprehensive problems and in the use and operation of pilot plant sized equipment.

Students planning to major in chemical engineering should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 31, 32; Physics 25, 26; and Civil Engineering 34.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Chemistry 65, Physical	4	Chemistry 66, Physical	4
Chem. Engin. 57, Inorg. Tech.	3	Chem. Engin. 60, Heat-Energy	3
Chem. Engin. 55, Calculations	3	Chem. Engin. 56, Unit Operations I	3
Civil Engin. 53, Strength of Materials	3	Professional elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. Engin. 93, Comp. Prob.	3	Chem. Engin. 76, Abstracts	2
Chem. Engin. 97, Unit Ops. II	3	Chem. Engin. 94, Comp. Prob. II	4
Elec. Engin. 63, Elements	3	Chem. Engin. 98, Adv. Unit Ops.	2
Professional electives	5	Elec. Engin. 74, Electronics	3
History	3	Professional elective	3-4
		Economics 25 or Psychology 26	3

ENTOMOLOGY

C. P. ALEXANDER, *Adviser*

Courses in entomology serve a variety of functions, such as to give students a broad knowledge of insects, particularly in their relations to man, his crops, his animals, and his health. Students are trained to become entomologists in the service of the United States, or in various state, territorial, or foreign services. Special emphasis is now placed on medical entomology in conjunction with

the armed forces at home and abroad. Other fields of training include forest entomology; control of pests in buildings; research, technical service or sales work with manufacturers of insecticides; teachers of zoology, particularly entomology, at the university level; and various other branches.

The courses in beekeeping are offered with the following aims: (1) to meet the increase in vocational opportunities for the production of bees or honey as a business; (2) to study the beekeeping needs of fruit and truck-crop industries and the part that bees play in the pollination of flowers; (3) to acquaint the student with a recreational field that can be made profitable.

Majors are required to take Entomology 26 in the sophomore year. Strongly recommended sophomore subjects include Botany 25, 26; Zoology 25; Chemistry 29, 30; Zoology 35; and either French or German, or both.

Juniors and seniors should support their work in entomology with the following courses: Botany 51, 52; Bacteriology 61, 62; Chemistry 51, 52; Zoology 51, 69, 70; Pomology 56; English 84; and selected courses in education, floriculture, forestry, horticulture, and other subjects.

GEOLOGY AND MINERALOGY

L. R. WILSON, *Adviser*

The offerings in geology and mineralogy are intended chiefly for those who wish to gain some acquaintance with one or more branches of earth science. For the general student prerequisite requirements are reduced to a minimum. A program of moderate specialization may be provided for science majors who are interested in geology.

To major in geology a student must complete thirty credit hours of work in the department. Those who have completed nine or more credits in geology in addition to the sophomore courses by the end of the junior year, and who wish to satisfy major requirements for graduation in the field of geology, will be given individual or group problems in the senior year. The nature of the work will depend upon student interest and preparation. In any junior or senior course in geology an additional period per week without credit may be required of students who specialize in this field. Chemistry through qualitative analysis and a year's work in college physics represent minimum requirements in these respective fields for undergraduate specialization in physical geology. For those interested in pursuing studies in stratigraphy or paleontology, work

beyond the freshman year in the systematic aspects of both botany and zoology is essential for satisfactory progress.

MATHEMATICS

A. E. ANDERSEN, *Adviser*

The department offers courses designed to furnish a cultural background as well as a foundation for both undergraduate and graduate work in such fields of science as physics and chemistry, in engineering and in other technical subjects.

The courses recommended for majors in the department are designed to prepare students for high school teaching, graduate study in mathematics, actuarial work, statistical work, or work as engineering aides.

All majors are required to take Mathematics 29 and 30 and Physics 25 and 26 in the sophomore year. In the junior and senior years each major must take Mathematics 65, 91, and 92 and must, in addition, complete at least 15 credits in the following courses: Mathematics 51, 55, 60, 62, 66, 71, 72, and 94.

PHYSICS

W. F. POWERS, *Adviser*

The physics courses give opportunity for the study of basic physical laws and phenomena of nature.

Emphasis is put on the applications of the principles studied. From these courses students may make a selection to satisfy a major in physics, or to comply with requirements for graduate study.

Majors must take Physics 25, 26 and Mathematics 29, 30 in the sophomore year. They are also advised to elect Chemistry 31 and 32.

Juniors and seniors should plan to take all of the courses offered by the department. These courses should be supported by additional work in mathematics and chemistry. As the interests of major students will vary, the department members will be glad to make suggestions to individuals regarding their program of studies.

ZOOLOGY

G. L. WOODSIDE, *Adviser*

The courses in zoology have two major aims: (1) to offer students an opportunity to develop an understanding and appreciation of the scientific method as a part of a liberal education; and

(2) to provide training for prospective graduate students in biology, medicine, dentistry, and related fields, as well as future teachers and laboratory technicians in the biological sciences.

The minimum requirements for majors are: Zoology 1, 35, 50, 53, 71, 72, and either 83 or 84; Chemistry 1, 2, 29, 30, 51, 52; Physics 25, 26.

SPECIAL CURRICULA IN SCIENCE

In addition to the major work provided in the departments previously listed, the following special curricula are available. For the most part these cut across departmental and even divisional lines. Students in these curricula follow the uniform science program for the freshman year and the recommendation in regard to sophomore electives indicated in each curriculum.

PRE-MEDICAL CURRICULUM

Advisory Committee: G. L. Woodside, Chairman, W. L. Machmer, G. W. Alderman, L. M. Bartlett, W. S. Ritchie, J. H. Smith.

Pre-medical and pre-dental students should register with a member of the pre-medical advisory committee as soon as possible after entering the university. Pre-veterinary students may register with the pre-medical advisory committee or with the school of their choice. Pre-medical or pre-dental students will be assigned a member of the committee as adviser, and as long as they remain pre-medical or pre-dental students they will continue under this adviser. The assignment is made alphabetically as follows: A-C, Dr. Woodside; D-G, Dr. Smith; H-L, Dr. Ritchie; M-R, Dr. Bartlett; S-Z, Mr. Alderman. During the second semester of the sophomore year the committee will study the academic record and general qualifications of every pre-medical and pre-dental student. After such careful study specific recommendations will be made as to whether each student should continue with the curriculum or change his objective and choose another major.

During the first two years the student in this curriculum follows the School of Science program outlined on page 98. He will be required also to complete fifteen junior-senior credits in the department of his choice, but the member of the pre-medical advisory committee to whom he has been assigned will continue to be his adviser. In the sophomore year the following courses should be elected: Chemistry 29, 30; Physics 25, 26; German 25, 26.

In the senior year Chemistry 65, 66 (Physical) is highly recommended (prerequisites, Mathematics 29, 30).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Zoology 71, Comp. Vert. Anatomy	4	Zoology 72, Vert. Embryology	4
History	3	¹ Electives	9
¹ Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
¹ Electives	15	Zoology 84, Cellular	4
		¹ Electives	12

¹ The electives of the junior and senior years should include the requirements of the department in which the student wishes to major. Pre-medical students should elect as many courses in the School of Liberal Arts as possible, since Class A medical schools uniformly stress the importance of a broad general education.

CURRICULUM IN NURSING

L. A. BRADLEY, *Adviser*

The opportunity is available for women students completing two years of study to transfer to the Cornell School of Nursing and other accredited Schools of Nursing, and after three years to obtain both the degree of B.S. and R.N. Such students must include in their freshman and sophomore programs six hours of chemistry, six hours of biology, and three hours of psychology.

CURRICULUM IN RECREATIONAL LEADERSHIP

W. G. VINAL, *Adviser*

This curriculum is opened to a limited number of recommended students who seek training as leaders in the various recreational activities (physical, park, community, nature, camping, and the like).

The course of each student is planned to fit his personal aims and aptitudes. The freshman and sophomore requirements are those of the School of Science. The required upperclass courses are Bacteriology 61, Art 75; Biological Field Studies 51 and 52, 61 and 62 or Physical Education 73. A minimum of 15 semester hours in some one field related to that branch of recreational leadership chosen by the student is expected.

Because programs of study vary with the individual student, three types of curricula taken by former students are given below:

PLAYGROUND LEADER IN URBAN AREAS

JUNIOR YEAR

German 25	Physical Educ. 53
Physics 25	German 26
Forestry 55	Forestry 56
Biol. Field Stu. 51	Biol. Field Stu. 52
Physical Educ. 55	Physical Educ. 72

SENIOR YEAR

Bacteriology 61	Entomology 26
Land Arch. 51	English 64
Land Arch. 79	Land Arch. 52
Art 75	Bacteriology 62
Biol. Field Stu. 61	Biol. Field Stu. 62
Physical Educ. 71	Physical Educ. 52

RANGER NATURALIST IN METROPOLITAN AND
NATIONAL PARKS

Military Science 51	Military Sci. 52	Military Sci. 75	Military Sci. 76
Sociology 51	Land Arch 52	Botany 81	Botany 84
Land Arch. 51	Economics 25	Land Arch. 75	Geology 62
Bacteriology 61	Astronomy 58	Botany 25	Physical Educ. 72
Forestry 55	Forestry 56	Speech 91	Biol. Field Stu. 62
Biol. Field Stu. 51	Biol. Field Stu. 52	Biol. Field Stu. 61	

COMMUNITY RECREATION

Sociology 51	Entomology 90	English 65	English 51
Education 51	Speech 89	Speech 91	English 68
French 29	French 30	French 71	Home Econ. 80
Bacteriology 61	English 46	Land Arch. 75	Physical Ed. 82
Physical Ed. 61	Physical Ed. 62	Physical Ed. 81	Biol. Field Stu. 62
Biol. Field Stu. 51	Biol. Field Stu. 52	Biol. Field Stu. 61	Physics 58
Music 61			

SCHOOL OF AGRICULTURE
AND HORTICULTURED. H. SIELING, *Dean*

The work in the School of Agriculture and Horticulture is planned to provide a sound superstructure of applied science and technology reared on a firm and broad foundation of pure science and social humanistic studies. Upon graduation the student will have devoted about one-quarter of his time to pure science, one-quarter to social and humanistic studies, and one-half to applied science and technology in the various fields of agriculture and horticulture.

The Trustees of the Lotta Crabtree Agricultural Fund have made available a substantial sum to aid graduates in the purchase of farms. Detailed information may be obtained from the Dean of the School of Agriculture and Horticulture.

CURRICULA IN AGRICULTURE

For students majoring in Agricultural Economics and Farm Management; Agronomy; Animal Husbandry; Dairy Industry; or Poultry Husbandry, the following curricula are available.

All students will take the following uniform curriculum during the first two years:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Mathematics 7, Algebra and Trigonometry	3	Mathematics 8 or 10	3
Chemistry 1, General	3	Chemistry 2, General	3
Botany 1, General	3	Zoology 1, General	3
Animal Husbandry 1, Survey of Agriculture	3	Agronomy 2, Soils	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Survey of Lit.	3	English 26, Survey of Lit.	3
Economics 25, Elements	3	Psychology 26, General	3
² A Science		² A Science	3
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1
<i>Two of the following:</i>		<i>Two of the following:</i>	
Dairy Industry 25	3	Animal Husbandry 26	3
Poultry Husbandry 25	3	Agricultural Economics 26	3
² A Science	3	² A Science	3
² A Science	3	² A Science	3

¹ Students who are prepared and wish to take Calculus as sophomores should elect Mathematics 7 and 10. Candidates for the Bachelor of Vocational Agriculture degree take History in place of Mathematics.

² To be selected from the following:

	<i>Credits</i>		<i>Credits</i>
Bacteriology 31, 31A	4	Mathematics 29, 30	3
Botany 25, 26	3	Physics 25, 26	4
Chemistry 29, 30	4	Zoology 25, 35	3
Chemistry 31, 32	3	Entomology 26	3
Geology 27, 28	3		

JUNIOR-SENIOR CURRICULA IN AGRICULTURE

At the end of the sophomore year each student selects one of the following curricula as his major for the last two years.

Students in each curriculum must successfully complete one summer of placement training on a farm, in a dairy plant, or in some business allied to agriculture as stipulated by their major adviser. It is recommended that this graduation requirement be met during the summer immediately following the sophomore year of university residence.

During the spring of the senior year, they must also pass a comprehensive written examination set by the department in which they are majoring; a comprehensive oral examination covering the whole field of agriculture administered by a visiting board of agri-

cultural leaders; and must present an oral paper on some personally chosen topic before another visiting board of agricultural leaders.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

A. H. LINDSEY, *Adviser*

The purpose of the Agricultural Economics and Farm Management major is to train students for positions in those private and government institutions servicing the agricultural industry and to assist in the training of farm managers.

The department maintains an inventory of current price information and agricultural production reports from which price study and analysis may be made. Statistical machines are also available for computation and analysis. The laboratories of the department must be found in business institutions and on farms in Massachusetts with which contact is maintained.

Two curricula are available.

AGRICULTURAL ECONOMICS

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Ec. 55, Mark'g Farm Prod.	3	Ag. Ec. 56, Coop. in Agri.	3
Ag. Ec. 57, Agri. Credit	3	Agricultural Electives	6
Agricultural Electives	6	General Electives	6
General Electives	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25	3	Agri. Ec. 76, Farm Mgt.	2
Agri. Ec. 79, El. Statis.	3	Agricultural Electives	3
Ag. Ec. 75, Farm Mgt.	3	General Electives	11
Agricultural Electives	3		
General Electives	3		

All Agricultural Economics majors must take the courses listed above. Specialization may be in one of the three following fields: (1) Animal products, (2) Fruits and Vegetables, (3) Feeds and Fertilizers.

The following courses should be completed for each of these specialized fields:

<i>Animal Products</i>	<i>Fruits and Vegetables</i>	<i>Feed and Fertilizer</i>
An. Husb. 53	Pomology 53	Agronomy 51
An. Husb. 54	Pomology 77	Agronomy 52
Dairy 52	Olericulture 74	Agronomy 78
Dairy 77	Olericulture 78	An. Husb. 51
Dairy 78	Food Technology 75	An. Husb. 78
Poultry 75		Poultry 56

FARM MANAGEMENT

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 55, Mktg. Farm Prod.	3	Agri. Ec. 56, Coop. Agri.	3
Agri. Ec. 57, Agri. Cr.	3	Agronomy 52, Soil Util.	3
An. Husb. 51, Nutrition	3	Agri. Ec. 78, Land Econ.	3
Electives	6	Bus. Law 70	3
		Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 71, Theory	3	Agri. Ec. 76, Farm Mgt.	2
Ag. Ec. 75, Farm Mgt.	3	An. Husb. 78, Dairy Cattle Prod.	4
Agronomy 51, Field Crops	3	Poultry 78, Management	2
Forestry 55, Mgt. Woodlands	3	Electives	8
Electives	3		

AGRONOMY

W. G. COLBY, *Adviser*

The department of agronomy is equipped with modern soils, crops and chemical laboratories, greenhouses, and utilizes parts of the university farm for fertilizer and plant growth experimentation, and for demonstration of soil utilization and conservation.

The courses are designed to give instruction concerning the basic knowledge of the soil and its management, fertilizers, and their uses as related to the principal products of the field. Crop improvement practices and the science of crop improvement are stressed for those who are interested in agronomy as a specialty.

There is sufficient flexibility within the curriculum to allow the student to specialize in soil science, plant science, soil conservation or general agronomy. Those students who have a desire to receive training which will qualify them for investigational work in these fields may obtain it by selecting appropriate supporting science or vocational subjects as electives. This training equips them to serve as specialists in one of these selected fields for industrial corporations and may serve also as training for extension or teaching work.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 57, Soil Formation	3	Agron. 52, Soil Utilization	3
Zoology 53, Genetics	3	Electives	9
Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 51, Field Crops	3	Agron. 78, Fertilizer and Soil Fertility	3
Chem. 51, Organic	4	Chem. 52, Organic	4
Electives	9	Electives	9

ANIMAL HUSBANDRY

V. A. RICE, *Adviser*

In the University barns are maintained Percheron horses; Aberdeen-Angus, Ayrshire, Guernsey, Hereford, Jersey, Holstein and Milking Shorthorn cattle; Shropshire and Southdown sheep; and Chester White swine. The university farm is operated as a livestock farm, producing all its necessary roughage in the form of pastures, hay and silage and a portion of its required grain.

The broad purpose of the Animal Husbandry major is that of providing the basic training for specialists in animal husbandry. Upon graduation, opportunities are available in the practical, scientific or commercial fields of animal husbandry; i.e., livestock farming, research, teaching, administration, or in the business phases of the livestock industry.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 51, Nutrition of Farm An.	3	An. Husb. 56, 56A, Beef and Sheep Production	4
An. Husb. 53, El. Meat Packing	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 75, An. Breeding	4	An. Husb. 76, Animal Breeding Practice	1
An. Husb. 81, Seminar	1	An. Husb. 78, Dairy Cattle Production	4
Electives		An. Husb. 82, Seminar	1
		Electives	

DAIRY INDUSTRY

D. J. HANKINSON, *Adviser*

Major students in Dairy Industry receive instruction in the testing, handling, and processing of milk, ice cream, butter, cheese, and other milk products. Practical application is made of chemistry, bacteriology, economics, and engineering in the many phases of dairy work.

The dairy industry department, with student laboratories for the testing and manufacture of dairy products, research laboratories, and commercial scale milk and ice cream plant facilities, is housed in Flint Laboratory, a building devoted solely to dairy work.

Dairy industry graduates may secure responsible positions with commercial dairy manufacturing firms, or with equipment and supply firms. Opportunities are offered also for positions as teachers in high schools and colleges, for service in the fields of

extension and research, and for sanitation and public health work with city, state or federal agencies.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 77, Butter and Cheese	4	Dairy Ind. 50, Judging	1
Chem. 51, Organic	4	Dairy Ind. 52, Mkt. Milk	4
Bact. 61, Public Health	3	Chem. 52, Organic	4
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 75, Chemistry	3	Engineering 80, Dairy Mech.	2
Dairy Ind. 79, Seminar	1	Dairy Ind. 78, Ice Cream	4
Bact. 81, Applied	3	Dairy Ind. 80, Seminar	1
Electives	9	Bact. 90, sanitary	3
		Electives	6

POULTRY HUSBANDRY

F. P. JEFFREY, *Adviser*

The department gives instruction in the science, art and practices of poultry keeping, not only to students specializing in this department, but also to those in other departments who desire supporting work in poultry husbandry. The major courses prepare men for the successful operation of commercial poultry and breeding farms and hatcheries either as owners or managers; for high school, college and federal work in teaching, extension and research; and as service men, specialists and managers in industrial fields allied to the poultry industry.

Rhode Island Reds, Barred Plymouth Rocks, White Plymouth Rocks, New Hampshires, and S. C. White Leghorns and several other breeds are maintained on a commercial basis at the poultry plant. There are modern buildings in which ventilation, breeding, feeding, incubation, brooding, marketing and managerial experimental projects are taking place, with up-to-date equipment.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 55, Housing and Sanitation	2	Poultry Husb. 52, Incubation and Brooding	3
Poultry Husb. 53, Judging	3	Poultry Husb. 56, Nutrition	3
Zoology 35	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 75, Marketing	2	Poultry Husb. 78, Seminar and Farm Management	3-4
Poultry Husb. 77, Breeding	3	Poultry Husb. 76, Turkey Prod.	2
Electives		Vet. Sci. 88, Avian Path.	3
		Electives	

CURRICULUM IN GENERAL AGRICULTURE

V. A. RICE, *Adviser*

If instead of majoring in any single department a student wishes to spread his major more broadly over the field of agriculture, he may elect the following curriculum in General Agriculture:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 51, Nutrition of Farm Animals	3	Dairy Ind. 52, Market Milk	4
Agron. 51, Field Crops	3	Agron. 78, Fertilizers	3
Pomology 53, General	3	Olericulture 78, Commercial	3
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 75, Farm Organization and Mgt.	3	Agri. Ec. 76, Farm Or. and Mgt.	2
Vet. Sci. 78	3	An. Husb. 78, Dairy Cattle Prod.	4
Forestry 55, Mgt. of Woodlands	3	Poultry Husb. 78, Farm Organization	3
Electives	6	Electives	6

CURRICULUM IN AGRICULTURE AND HORTICULTURE
FOR EXTENSION WORKJAMES W. DAYTON, *Adviser*

There is an excellent opportunity in the Extension Service for a limited number of students interested in county agent and 4-H Club work. For a position in this field a student should have a general agricultural and horticultural education. Apprentice training between the junior and senior years is recommended.

FRESHMAN AND SOPHOMORE YEARS

For the first two years the student follows the curriculum in either Agriculture or Horticulture.

JUNIOR-SENIOR CURRICULUM

The student chooses a major in Agricultural Economics, Animal Husbandry, Pomology, Poultry, or Olericulture, taking 15 credits in the department in which he is specializing and the following courses: Economics 55, Education 61 and 66, English 81, Journalism 85 and 86, Psychology 55, Speech 91 and 92.

Electives should be chosen from the following, if not included in the freshman or sophomore year, or as a major:

Agriculture 1
 Agricultural Economics 26, 55, 76, 82
 Agronomy 51, 78
 Animal Husbandry 26, 51, 75, 78, 91
 Bacteriology 31
 Botany 25, 51, 77, 78
 Chemistry 31, 32
 Dairy 25

Agricultural Engineering 72, 74
 Entomology 26, 51, 80
 Forestry 55, 56
 Geology 27, 28
 History—3 credits
 Horticulture 1
 Olericulture 25, 51, 74, 78
 Physics 57
 Pomology 26, 51, 53, 56
 Veterinary 78

VETERINARY SCIENCE

Though major work in Veterinary Science is not available, the department does offer supporting courses to assist students who expect to enter the various fields of agriculture, public health, teaching and laboratory work in the biological sciences or veterinary medicine.

CURRICULA IN HORTICULTURE

For students majoring in the Departments of Floriculture, Food Technology, Forestry and Wildlife Management, Landscape Architecture, Olericulture, or Pomology, the following curricula are available.

Each departmental curriculum is designed to give the student a thorough training in the Sciences and Arts involved most closely in the solution of problems in the field of that department and in the broader field of life in these times. Each curriculum provides a well considered foundation from which increasing effectiveness may be attained with further study and experience. Electives in the junior and senior years provide an opportunity for the pursuit of special interests or for the correction of deficiencies which might later be a handicap.

The program of studies for the first two years is fairly uniform for all curricula and is outlined as follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Botany 1 or Zoology 1	3	Botany 1 or Zoology 1	3
¹ Chemistry 1, General	3	Chemistry 2, General	3
² Mathematics 7	3	Mathematics 8 or 10	3
³ Hort. 1, Plant Propagation	3	³ Agronomy 2, Soils	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

¹ Majors in Landscape Architecture and Ornamental Horticulture may substitute a Foreign Language or History 5 and 6 for the year course in Chemistry. Majors in Forestry take Geology 27 in place of Botany 1.

² Students who expect to take Calculus in the sophomore year should elect Mathematics 7 and 10. Candidates for the Bachelor of Vocational Agriculture degree take History in place of Mathematics.

³ Food Technology majors will take Mechanical Engineering 1 (Drawing) in place of Horticulture 1. One year of modern language may be substituted for Drawing 1 and Agronomy 2 by special permission. Wildlife Management majors may take Mechanical Engineering 1 (Drawing) in place of Horticulture 1 or a year of modern language in place of Horticulture 1 and Agronomy 2.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Survey of Lit.	3	English 26, Survey of Lit.	3
Economics 25 or Psychology 26	3	Psychology 26 or Economics 25	3
A Science	3	A Science	3
Electives	6	Electives	6
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

In making all elections students should be guided by the departmental recommendations for the sophomore year to be found in the following description of junior-senior curricula in horticulture.

JUNIOR-SENIOR CURRICULA IN HORTICULTURE

Juniors and seniors in horticulture will elect their major work in one of the following curricula:

FLORICULTURE

C. L. THAYER, *Adviser*

The courses in Floriculture provide for a comprehensive and detailed study of the practices and principles involved in the production, marketing and uses of cut flowers, flowering and foliage plants grown outdoors and under glass. Opportunities available to graduates may include: positions in various fields of commercial floriculture, such as production, wholesale marketing and retailing; employment in nurseries, on private estates and in conservatories; positions in the professional field, including graduate study, teaching in colleges and secondary schools, research and extension work under state, Federal, or other supervision.

It is advantageous for the student to determine, as soon as possible, the type of position for which he wishes to fit himself since the choice of elective courses will depend largely on his decision.

As sophomores majors are advised to take Chemistry 29 and 30 for their Sciences. First semester electives should be Botany

25 and Olericulture 25; second semester Entomology 26 and Floriculture 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 51, Greenhouse Mgt.	3	Flori. 52, Flower Arrangement	3
Flori. 79, Conservatory Plants or	2	Flori. 54, Greenhouse Const.	3
Flori. 81, Herb. Gardens and		Plant Breeding 52, Methods	3
borders	3	Botany 51, Plant Pathology	3
Zoology 53, Prin. of Genetics	3	Electives	6
Entomology 51, Pests of			
Special Crops	3		
Electives	5-6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 75, Commercial	3	Flori. 76, Commercial	3
Flori. 79 or	2	Flori. 82, Seminar	3
Flori. 81	3	Botany 68, Physiology	3
Botany 67, Physiology	3	Electives	8
Electives	8-9		

FOOD TECHNOLOGY

C. R. FELLERS, *Adviser*

The curriculum in Food Technology provides scientific and applied training in the principles concerned with the processing, preservation, and packaging of foods and food products. Both home and commercial methods of food preservation are considered. Practical work includes canning, freezing, dehydration, and fermentation and salting. Methods of manufacture of jams, jellies, fruit juices, and beverages are a part of course work. An effort is made to apply the student's background in chemistry and bacteriology to Food Technology problems and food analysis.

The curriculum gives the student a broad science background with specialized knowledge in food processing and preservation. Special courses are offered for Home Economics majors who plan to teach or do extension work in foods. Major fields open to graduates include: (1) commercial work in cannery, freezer and other plant operation; (2) control and analytical work related to food products; (3) government food inspection and grading; (4) technological work in government and industry.

Ambitious students are encouraged to acquire the background which will enable them to pursue graduate work and research in the application of scientific knowledge to the technology of foods.

The selection of supporting courses depends upon the objective of the student, which should be determined as early as possible.

Food Technology majors should take Physics 25 and 26 and Chemistry 29 and 30 in the sophomore year; also, if possible, Bac-

teriology 31 and 31A. Students planning to take Physical Chemistry should complete Mathematics 29 and 30.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 51, Introductory	3	Food Tech. 52, Food Prod.	3
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Bacteriology 51	3	Bacteriology 82, Applied	3
Electives		Agr. Engin. 80, Food Engin.	3
		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 61, Industrial Technology	3	Food Tech. 62, Industrial Technology	3
Food Tech. 71, Food Science Literature	2	Food Tech. 72, Food Science Literature	2
Food Tech. 91, Analysis of Food Prod.	3	Food Tech. 92, Exam. of Food Prod.	3
Chemistry 79, Physiological or	4	Food Tech. 82, Confections and Cereal Products or	2
Chemistry 65, Physical	3	Chemistry 66, Physical	3
Electives		Electives	

SUGGESTED JUNIOR-SENIOR ELECTIVES

Public Health 61, 62, 63	Poult. Husbandry 75
A Foreign Language	Olericulture 73, 74
Mechanical Engin. 1, 63	Botany 66
Pomology 77	Home Ec. 30, 52, 54
Dairy Ind. 75, 77, 52 or 78	Food Tech. 85, 95
Animal Husbandry 53	Chem. Engin. 77, 75
	Indus. Engin. 25, 51

FORESTRY AND WILDLIFE MANAGEMENT

This department offers two curricula, one in Forestry and one in Wildlife Management.

FORESTRY

R. P. HOLDSWORTH, *Adviser*

The curriculum in forestry includes a series of courses in technical forestry sufficiently comprehensive to meet the requirements for general undergraduate preparation in this professional field. With its supporting and cognate courses it meets the requirements for admission to the Junior Forester examination. Should the student upon receiving the Bachelor's Degree follow the highly desirable procedure of continuing his education at a graduate school of forestry, he should receive credit for a considerable proportion of the technical courses accomplished here. The additional time required to obtain the Master of Forestry Degree would normally be one year.

Should the student elect to pursue a pre-professional curriculum in forestry, giving less time to technical forestry courses and more to the basic sciences and cultural subjects, the time required to obtain the Master of Forestry Degree at a graduate school after graduation here will be two years.

Most of the forestry courses are open to students other than those concentrating in forestry, but these courses should be elected only after consultation with the student's major adviser, and the instructor teaching the course.

During a summer term following the freshman year forestry majors should plan to take Forest Mensuration, Forest Photogrammetry, and Plane Surveying. These courses are part of the regular curriculum and are basic to forestry employment during the summer following the sophomore and junior years.

Sophomore majors in forestry take Physics 25 and Botany 1 the first semester; Entomology 26, Physics 26, Botany 28, and Forestry 26 the second semester.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 53, Silvics	3	Forestry 56, Prin. of Silviculture	3
Forestry 59, Protection	3	Forestry 54, Forest Soils	3
Forestry 75, Products	3	Wildlife Mgt. 72, Forest-Animal	
History	3	Relationships	3
Elective	3	Entomology 72, Forest Ent.	3
		History	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 81, Regional Silvicult.	3	Forestry 82, Seeding and Planting	3
Forestry 57, Forest Policy & Econ.	3	Forestry 80, Forest Mgt.	3
Botany 51, Plant Pathology	3	Forestry 78, Harvesting	3
Electives*	6	Electives*	6

*Electives should be chosen in consultation with the student's adviser.

WILDLIFE MANAGEMENT

R. E. TRIPPENSEE, *Adviser*

The courses in wildlife management are designed both for those who desire a general understanding of the conservation of wild animals and for the professional student who expects to make his living in the wildlife field. Courses in wildlife conservation and management make excellent supporting work for students of public administration, economics, zoology, entomology, and forestry. Particular emphasis is given to wild animals on both forest and farm lands.

Students who expect to continue studies for advanced degrees are eligible for graduate work either in Graduate School at the University of Massachusetts or in other institutions offering graduate work in this field.

Wildlife management is both an applied science and an art, and is concerned with the production and control of wild-animals crops on both wild and cultivated lands. In order to manage land, a knowledge of the origin and management of land is necessary. Thus, work in geology, soils, forestry, and agriculture is included in the training. Fields of specialization include fisheries management, game management, fur production, and control of injurious animals. Related fields include soil conservation, conservation education, and industrial biology.

Studies in wildlife management will be closely correlated with the work carried on by the State Department of Conservation and the U. S. Fish and Wildlife Service. During the junior and senior years trips will be planned to study the work at the John C. Phillips Wildlife Laboratory at Upton and to attend the New England Game Conference at Boston. Numerous other wildlife projects will also be visited.

Wildlife Management majors are required to take one year of language and Agronomy 2. They are urged to take Forestry 52 and 55 during the summer session following the freshman year if possible.

Sophomores should elect four courses from the following: Wildlife Management 27, Forestry 26, Bacteriology 31 and 31A, Zoology 35, Chemistry 29, Geology 27, Mathematics 29, Physics 25 and 26, Entomology 26.

Students expecting to go into fisheries management should elect Physics 25 and 26; Chemistry 29, 30; Zoology 35, 74, 81, 86; Public Health 64.

Students who expect to go into Public Relations or teaching should elect English 81 or 84, Speech 91 or 92, and Education 52, 61, 62.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 71 or 75	3	Wildlife Management 70	3
Electives*		Wildlife Management 74 or 84	3
		Electives*	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 75 or 71		Wildlife Management 74 or 84	3
Electives*		Electives*	

LANDSCAPE ARCHITECTURE

R. H. OTTO, *Adviser*

Instruction in this department has two objectives: first a contribution to general education; second, a preparation of students for the professional practice of Landscape Architecture. The department offers optional curricula, (1) Professional Landscape Architecture, and (2) Ornamental Horticulture.

LANDSCAPE ARCHITECTURE

Students following this professional curriculum are prepared to take up work in Landscape Architecture, which leads through field experience or post-graduate study to permanent establishment in the profession.

Sophomores in the first semester elect either Botany 25 or Geology 27 for their Science and take Landscape Architecture 25 (Drawing) and Civil Engineering 27 as electives. In the second semester the Science is either Entomology 26 or Geology 28 and the elective Landscape Architecture 26 (Drafting) and Horticulture 26 (Plant Materials).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Elements of	
Landscape Arch. 53, Garden		Landscape Arch.	3
Design	3	Landscape Arch. 54, General	
Hort. 51, Plant Materials	3	Design	3
Landscape Arch. 79, Construction		Hort. 52, Planting Design	3
& Maintenance alternate		Electives	6
with Art 83	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 81, Advanced		Landscape Arch. 76, Civic Art	3
Design	3	Landscape Arch. 82, Advanced	
Art 75, Art Appreciation	3	Design	3
Art 77, History of Art	3	Art 78, History of Art	3
Landscape Arch. 83, alternate		Landscape Arch. 80, History and	
with Landscape Arch. 79	3	Lit. of Landscape Arch.	2
Elective	3	Electives	4

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Agronomy 53, 56, Agrostology	Agric. Engin. 51, House Planning
Landscape Arch. 84, Sketching	English 84, Library Research
Botany 67, 68, Plant Physiology	Floriculture 81, Herbaceous Borders
Botany 81, Plant Ecology	

ORNAMENTAL HORTICULTURE

The curriculum in Ornamental Horticulture is suggested for those preferring to follow the horticultural phase of Landscape including (1) nursery work; (2) planting; and (3) maintenance

of landscaped areas, such as parks and semi-public institution grounds.

Sophomores in this major will take Botany 25, Civil Engineering 27, Landscape Architecture 25 in the first semester; Entomology 26, Floriculture 26, and Horticulture 26 in the second.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Hort. 51, Plant Materials	3	Hort. 52, Planting Design	3
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Construction details	3
Agronomy 53, Turf Grasses	3	Pomology 26, Small Fruits	3
Landscape Arch. 79, Construction & Maintenance alternate with Botany 81	3	Agronomy 56, Turf Mgt.	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 81, Herbaceous Borders	3	Entomology 72, Shade Tree Insects	3
Landscape Arch. 53, Garden Design	3	Pomology 56, Spraying	3
Plant Breeding 51, Genetics	3	Plant Breeding 52, Advanced	3
Forestry 55, Mgt. of Woodlands	3	Botany 51, Plant Pathology	3
Botany 81, Plant Ecology	3	Elective	4
Alternate with Landscape Arch. 79			

OLERICULTURE

G. B. SNYDER, *Adviser*

The courses in Olericulture offer a comprehensive training in the scientific principles and commercial practices related to the culture and marketing of vegetable crops. The studies and training involved are set up to prepare graduates to undertake work in the following fields: (1) practical work in operating commercial market garden or truck farms or greenhouse establishments, (2) teaching Olericulture and related subjects in college, secondary or high schools, (3) extension work in Horticulture and Agriculture, (4) research studies with state, Federal, or private agencies, (5) state, Federal, or private inspection service agencies, and (6) the wholesale and retail marketing of vegetables and other perishable commodities.

The department of Olericulture has facilities in greenhouses, plant houses, hot beds, machinery and equipment used in production and marketing procedures as well as land to provide the student ample opportunity to become acquainted with modern techniques and practices used in handling vegetable crops. Nearby truck farms, wholesale and retail market outlets, variety trial plots of seed companies and inspection agencies are used to demonstrate laboratory and classroom points of discussion.

The rather broad objectives of the training mean that the selection of supporting courses depends upon the specific field in which the student wishes to engage on graduation. This objective should, therefore, be determined as early as possible during the sophomore year.

Majors in Olericulture should take the following courses during the first semester of the sophomore year: Chemistry 29 Botany 25, and Olericulture 25. In the second semester they should include Chemistry 30, Entomology 26, and Pomology 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 51, Nutrient Requirements	3	Oleri. 52, Environment and	
Plant Breeding 51, Genetics	3	Plant Culture	3
Botany 51, Plant Pathology	3	Oleri. 54, Greenhouse Crops	3
Botany 67, Plant Physiology	3	Botany 68, Plant Physiology	3
Electives	5	Electives	6-8

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 73, Marketing Practices	3	Oleri. 74, Merchandising of	
Oleri. 75, Systematic	3	Perishables	3
Oleri. 81, Seminar	1	Oleri. 78, Commercial	3
Entomology 51, Pests of		Oleri. 82, Seminar	1
Special Crops	3	Electives	10
Electives	7		

POMOLOGY

A. P. FRENCH, *Adviser*

The Pomology courses provide a comprehensive training in the scientific and commercial principles concerned in the growing and marketing of apples, pears, peaches, plums, cherries, and small fruits. Major fields open to graduates include: (1) practical work in connection with the operation of fruit farms; (2) teaching in college, high school, or secondary schools of agriculture; (3) extension work in county, state, or nation; (4) research work with state, federal or private connections; and (5) commercial work in connection with the manufacture and sale of such supplies as machinery, packages, and spraying and dusting materials. Certain supporting courses are required and their selection depends upon the objective of the student. That objective should, therefore, be determined as early as possible.

First semester sophomores are advised to elect Geology 27, Physics 25, and Olericulture 25. In the second semester they should take Chemistry 29, Entomology 26 and Pomology 26.

The selection of junior-senior electives should be undertaken with the help of the departmental adviser. They will depend for

the most part on the interests and objectives of the students and his class record to date. The student who wishes to do college teaching, extension work, or research is advised to secure a broad foundation in science and liberal arts, and to plan to enter a graduate school sooner or later. The student whose objective is growing fruit or teaching in secondary school may need to broaden his training in horticulture and agriculture and, again, will need all the science and liberal arts that can be included in the program. Students interested in cranberry culture will follow the curriculum in cranberry technology outlined below.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 53, General	3	Pomology 56, Spraying	3
Pomology 75, Systematic or	4	Botany 68, Physiology	3
Pomology 77, Commercial	3	Chemistry 32	3
Botany 51, Plant Pathology	3	Electives	
Botany 67, Physiology	3		
Chemistry 31	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 81, Advanced	3	Pomology 82, Advanced	3
Pomology 75, Systematic or		Pomology 84, Seminar	1
Pomology 77, Commercial	3	Electives	
Pomology 83, Seminar	1		
Zoology 53, Genetics	3		
Electives			

CURRICULUM IN CRANBERRY TECHNOLOGY

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. 31, Organic	3	Chem. 32, Organic	3
Botany 51, Plant Pathology	3	Pomology 56, Spraying	3
Ent. 51, Pests of Special Crops	3	Ag. Econ. 26, Ag'l Prod.	3
Electives		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bot. 67, Plant Physiology	3	Bot. 68, Plant Physiol. 3	3
Ag. Econ. 55, Marketing	3	Ag. Econ. 56, Cooperatn.	3
Pom. 85, Cranberry Prob.	2	Pom. 86, Cranberry Prob.	2
Electives		Electives	

SCHOOL OF BUSINESS ADMINISTRATION

PHILIP L. GAMBLE, *Acting Dean*

The School of Business Administration is designed to prepare students for the numerous activities connected with the inception, operation and control of business enterprises without overlooking the need for a well-rounded education. Four specialized and one

general curricula are offered to better prepare students for assuming the responsibilities of the adult citizen. Each of these curricula emphasizes general education in a common program for the first two years and reserves concentration on specialized programs for the last two years.

The differentiated and specialized curricula offered for the junior-senior years are in Accounting, Finance, Industrial Administration, and Marketing. These curricula are supplemented by a less specialized curriculum in General Business. Each course of study leads to the degree of Bachelor of Business Administration.

CURRICULA IN BUSINESS ADMINISTRATION

The courses for the first two years are largely prescribed. Each student therefore follows a nearly uniform program of studies until he begins his specialization. General education is emphasized by providing fundamental courses in the humanities, mathematics, science, and social science.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Government 25, American	3	History 6, Mod. European Civ.	3
Mathematics 7	3	Mathematics 8 or 10	3
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Foreign Language or Industrial		Foreign Language or Economics	
Adm. 11, Econ. Geography	3	12, Ec. Hist. of U. S.	3
Elective, Science	3	Elective, Science	3
Military 1	3	Military 2	2
Physical Ed. 7 (women)	2	Physical Ed. 8 (women)	2
Physical Ed. 3 (men)	1	Physical Ed. 4 (men)	1

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25, Principles of	3	Accounting 26, Principles of	3
Economics 25, Elements	3	Economics 26, Distribution	3
English 25, Survey of Eng. Lit.	3	English 26, Survey of Eng. Lit.	3
Psychology 26, General	3	Sociology 28, Elements	3
Elective	3	Elective	3
Military 25	2	Military 26	2
Physical Ed. 33 (men)	1	Physical Ed. 34 (men)	1
Physical Ed. 27 (women)	2	Physical Ed. 28 (women)	2

JUNIOR-SENIOR CURRICULA IN BUSINESS ADMINISTRATION

GENERAL BUSINESS

PHILIP L. GAMBLE, *Adviser*

This program is offered to meet the needs of those students whose interest is in general business rather than in some more specialized field. The program is designed to provide training in the

social sciences, particularly economics, as well as in the applied fields of business administration. This training should fit a man for initial employment in the training courses of large corporations or for work in small businesses and for further study in graduate school of a more specialized nature.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Credit	3	Business Law 70	3
Mktg. 53, Marketing & Mktg. Prob.	3	Ec. 56, Business Cycles	3
Ec. 79, Labor Problems	3	Ind. Adm. 76, Prin. of Transportation	3
Ag. Ec. 79, Prin. & Methods of Statistics	3	Ec. 80, Labor Legislation	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 65, Corporation Finance	3	Ec. 70, Monopolies	3
Ec. 73, Modern Econ. Theory	3	Fin. 78, Public Finance	3
Ind. Adm. 83, Business Mgt.	3	Professional Elective*	3
Professional Elective*	3	Electives	6
Elective	3		

* Professional electives are to be chosen subject to the approval of the adviser.

ACCOUNTING

RICHARD M. COLWELL, *Adviser*

This curriculum is designed to train students to understand business operations from the viewpoint of income, costs, valuation, financial systems and policies and the interpretation and execution thereof. In addition to providing a general business background, this curriculum is the foundation for advanced training in accountancy and financial management. The special positions of accountancy for which students can qualify are: auditors, certified public accountants, comptrollers, cost analysts, credit analysts, income-tax consultants, industrial accountants, public accountants, private accountants, system designers, and teachers of accounting.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Credit	3	Business Law 70	3
Finance 65, Corporation Finance	3	Acctg. 72, Advanced Acctg.	3
Mktg. 53, Marketing & Mktg. Prob.	3	English 84, Expository Writing	3
Acctg. 71, Advanced Acctg.	3	Electives	6
Ag. Ec. 79, Prin. & Methods of Statistics	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Ec. Theory	3	Fin. 78, Public Finance	3
Ind. Adm. 83, Business Mgt.	3	Ec. 82, Investments	3
Acct. 73, Cost Accounting	3	Acctg. 74, Acctg. Systems	3
Acct. 75, Adm. Acct. & Control	3	Acctg. 76, Auditing	3
Elective	3	Elective	3

FINANCE

MILO KIMBALL, *Adviser*

Courses in banking, finance and insurance are provided for students who expect to assume managerial responsibilities for financing a business or to work for banks, investment institutions, brokerage houses, insurance companies, and governmental agencies concerned with finance. The curriculum provides for study of our monetary and credit institutions, the principles and procedures of financial administration, the principles and practices of insurance, training for investment analysis and the formation of investment policies.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 53, Money, Banking & Crd.	3	Ec. 56, Business Cycles	3
Fin. 65, Corporation Finance	3	Ag. Ec. 79, Statistics	3
Ec. 79, Labor Problems	3	Bus. Law 70, Business Law	3
Mktg. 53, Principles of Mktg.	3	Professional Elective	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Econ. Theory	3	Fin. 76, Insurance	3
Ind. Adm. 83, Business Mgt.	3	Fin. 78, Public Finance	3
Fin. 81, Problems of Bus. Fin.	3	Fin. 82, Investments	3
Electives	6	Electives	6

INDUSTRIAL ADMINISTRATION

SHERMAN HOAR, *Adviser*

Expanding American industry now offers to qualified students the opportunity to find satisfying careers in the various fields of industrial management, labor relations, or personnel management. The curriculum offered is designed to give the student specialized training in these fields and a detailed and comprehensive understanding of the problems of business enterprise.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mktg. 53, Mktg., & Mktg. Prob.	3	Business Law 70	3
Ec. 79, Labor Problems	3	Acctg. 74, Acctg. Systems	3
Ind. Adm. 83, Business Mgt.	3	Ec. 80, Labor Legislation	3
Acctg. 73, Cost Accounting	3	Mktg. 52, Industrial Purchasing	3
Ag. Ec. 79, Prin. & Methods of Statistics	3	Mech. Engin. 28, Machine Shop	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Crdt.	3	Ind. Adm. 76, Prin. of Transportation	3
Fin. 65, Corporation Finance	3	Ind. Engin. 88, Time & Motion Study	3
Ec. 73, Modern Ec. Theory	3	Psych. 86, Industrial	3
Electives	6	Ind. Adm. 84, Personnel Adm.	3
		Electives	3

MARKETING

HAROLD E. HARDY, *Adviser*

This program is designed to train students to understand the advertising, selling and related problems of wholesale and retail enterprises and industrial firms. The curriculum offers general training in economics and business principles along with specialized study of basic types of market operations.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Credit	3	Mktg. 54, Sales Mgt & Salesmanship	3
Mktg. 53, Mktg. & Mktg Prob.	3	Mktg. 52, Industrial Purchasing	3
Ec. 79, Labor Problems	3	Business Law 70	3
Ag. Ec. 79, Prin. & Methods of Statistics	3	Ind. Adm. 76, Prin of Transportation	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 55, Ec. of Consumption	3	Mktg. 72, Market Research	3
Ec. 73, Modern Ec. Theory	3	Mktg. 74, New England Markets	3
Mktg. 71, Retail Merchandising	3	Psych. 86, Industrial Psych.	3
Mktg. 73, Advertising	3	Professional Elective*	3
Elective	3	Elective	3

* Professional elective is to be chosen subject to the approval of the adviser.

SCHOOL OF ENGINEERING

G. A. MARSTON, *Dean*

The departments of agricultural engineering, civil engineering, mechanical engineering and electrical engineering comprise the School of Engineering. Each department offers a curriculum leading to a Bachelor of Science Degree in that particular branch. An optional curriculum in industrial engineering is offered in the mechanical engineering department. Chemical Engineering is included in the School of Science.

The Civil, Electrical, Mechanical, and the Industrial optional curricula have been accredited by the Engineers Council for Professional Development.

Engineering can be defined as the combination of science and art by which materials and power are made useful to mankind. An engineer requires intensive technical training but at the same time he should acquire the broad education that distinguishes the professional man from the technician. His education does not end with formal schooling but continues throughout his life as he accumulates experience.

The curricula in engineering have been carefully prepared to offer each student the opportunity to acquire a sound training in the fundamental work of the various branches of his chosen field. At the same time he receives a thorough training in the sciences and mathematics, which are the important tools of the engineer. About twenty per cent of his time is devoted to the social and humanistic studies. Some opportunity to pursue his particular interest is offered in the senior year.

The curriculum of the freshman year is the same for all. Specialization to a limited extent begins in the sophomore year.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 5, Analytical		Mathematics 6, Diff. Calculus	4
Geom.	4	Physics 26, General	4
Physics 25, General	4	Mechanical Eng. 2 (Drawing)	2
Mechanical Engineering 1		Military 2	2
(Drawing)	2	Physical Ed. 4	1
Military 1	3		
Physical Ed. 3	1		

Elect one of the following:

History 5	3	History 6	3
German 1, 5	3	German 2, 6	3
French 1, 5, 15	3	French 2, 6, 16	3
Spanish 1, 7	3	Spanish 2, 8	3

SOPHOMORE-JUNIOR-SENIOR CURRICULA

Majors in Engineering will select one of the following curricula.

AGRICULTURAL ENGINEERING

H. N. STAPLETON, *Adviser*

Agricultural engineering is concerned with the application of scientific engineering principles to the agricultural industry in which mechanical and electrical power, processing equipment, design and development of a farm structure, soil and water conservation, research, extension, teaching, and promotional activities form parts.

The curriculum is designed to prepare students soundly in basic sciences, engineering, and humanistic subjects for service in this expanding field. There is opportunity for limited specialization and generous provision for electives in the third and fourth years.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Eng. 25, Lit	3	English 26, Lit.	3
Math. 31, Integr. Calculus	4	Math. 32, Diff. Equations	4
Chem. 1, General	3	Chem. 4, General	4
Civil Engin. 27, Surveying	3	Civil Engin. 34, Applied Mech	
Mech. Engin. 3, Descript. Geom.	2	(Statics)	3
Military 25	2	Psych. 26, General	3
Phys. Ed. 33	1	Military 26	2
		Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. Engin. 28, Prop. & Topog. Surv.	3	Civ. Engin. 30, Route Surveying Prac.	3
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(or approved industrial or farm employment)

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Engl. 83, Tech. Writing	2	Econ. 25, General	3
Civ. Eng. 52, Kinetics	3	Agron. 2, Soils	3
Civ. Eng. 51, Strength of Mat'l	4	Civ. Eng. 61, Testing	2
Elec. Eng. 61, Principles of	4	Elec. Eng. 62, Principles of	4
Mech. Eng. 65, Heat Eng.	3	Mech. Eng. 68, Kinematics	3
Ag. Eng. 71, Mech. Power	3	Ag. Eng. 73, Farm Structures	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Eng. 85, Farm Electrifi.	3	Ag. Eng. 92, Seminar	1
Ag. Econ. 75, Farm Mgt.	3	Ag. Eng. 76, Agr. Machinery	3
Mech. Eng. 83, Machine Design	3	Ag. Eng. 78, Drain, Recl., Consv.	3
Civ. Eng. 75, Fluid Mech.	3	Civ. Eng. 90, Constr., Spec., Est.	3
Ag.* & Tech.* Electives	6	Ag.* & Tech.* Electives	8-9

* Electives to be selected in consultation with the student's adviser.

CIVIL ENGINEERING

M. P. WHITE, *Adviser*

The profession of civil engineering once included all engineering except military. Today it includes the design and erection of all type of structures, planning and constructing highways, railroads and airports, hydraulics as applied to river control and water-power development, irrigation and drainage, water-supply and sanitary engineering, as well as surveying and mapping. Civil engineers may work on designing and planning, on construction, or on maintenance and operation. Those who enter construction must go wherever their projects take them, while those engaged in

design, maintenance or operation are generally located in cities or towns.

The curriculum gives a thorough preparation in the fundamental sciences and, at the same time, prepares the student for work in any branch of civil engineering.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd semester</i>	<i>Credits</i>
Eng. 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Chem. 1, General	3	Chem. 4, General	4
Mech. Engin. 3, Descript. Geom.	2	Elec. Engin. 63, Elements of	3
Civ. Engin. 25, Surveying	5	Civ. E. 34, Applied Mech.	
Military 25	2	(Statics)	3
Phys. Ed. 33	1	Military 26	2
		Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. E. 28, Prop. & Topog. Surv.	3	Civ. Eng. 30, Route Surveying Prac.	3
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JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Psych. 26 or Econ. 25	3	Econ. 25 or Psych. 28	3
Civ. Eng. 51, Strength of Mat'l.	4	Civ. Eng. 70, Theory of Structures	4
Civ. Eng. 55, Highway Engin.	3	Civ. Eng. 61, Testing Mat'ls	2
Civ. Eng. 52, Appl'd. Mech (Kinetics)	3	Civ. Engin. 80, Soil Mechanics	3
Mech. Eng. 65, Thermodynamics	3	Mech. Engin. 59, Mat'l. of Constr.	2
Geol. 50, Engin. Geol.	3	Civ. Engin. 76, Fluid Mechanics	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 71, Structural Design	3	Civ. Eng. 78, Sanitary Engin. II	4
Civ. Eng. 73, Concrete & Masonry	4	Civ. Eng. 90, Contracts, Specif. & Est.	3
Civ. Eng. 77, Sanitary Engin. I	3	Civ. Eng. 92, Professional Sem.	1
Civ. Eng. 81, Foundations	3	Technical Elective *	6
English 83, Technical Writing	2	Non Tech. Elective (Bus. Law 70 recommended)	3
Non-Tech. Elective (Am. Gov't. 25 recommended)	3	*Econ 76, Prin. of Transportation	
		*Civ. Eng. 72, Adv. Struct. Theory	
		*Civ. Eng. 84, Transportation Engin.	
		*Civ. Eng. 86, Sanitary Engin. Design	
		*Civ. Eng. 88, Adv. Stress Analysis	
		*Civ. Engin. 94, Advanced Surveying	
		*Civ. Engin. 96, Hydraulic Engin.	
		*Bact. 54, Fundamentals of Water & Sewerage Bact.	

ELECTRICAL ENGINEERING

ROBERT R. BROWN, *Adviser*

Electrical engineering is that branch of the profession covering the engineering applications of electricity. It reaches into practically every profession, every branch of activity, either through performance of the tasks involved, or through their measurement and control. Because it is so diversified in its applications, it is considered to be divided into various fields such as power communications, electronics, illumination, measurements and control and others, each of these having specialized subdivisions.

The undergraduate curriculum is designed to prepare the student for work in any of these fields, and to serve as a basis for specialization in any of them, either in advanced courses or in the field. At the same time, about one-fifth of the student's work is devoted to the humanistic-social courses so that he may have an understanding of the broader aspects of engineering and its relation to other fields of human endeavor.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff Equations	4
Chem. I, General	3	Chem. 4, General	4
Mech. Eng. 3, Descript. Geom.	2	Civ. E. 34, Ap. Mech. (Statics)	3
Econ. 25 or Psych. 26	3	Elec. Engin. 40, Fundamentals	4
Military 25	2	Military 26	2
Physical Ed. 33	1	Physical Ed. 34	1

SUMMER

(May be taken in summer after freshman year)

Mech. Engin. 23, Shop	3 credits
Civ. Engin. 27, Surveying	2 credits

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Eng. 51, A C. Circuits	4	Econ. 25, or Psych. 26	3
Elec. Eng. 53, D.C. Machinery	4	Elec. Eng. 54, A.C. Machinery	4
Elec. E. 57, Engin. Analy.	3	Elec. Eng. 74, Electronics	4
Mech. Eng. 65, Heat Engin. I	3	Civ. Eng. 61, Testing of Mat'ls.	2
Civ. Eng. 53, Strength of Mat'l	3	Mech.Eng. 66, Heat Engin.	3
English 83, Technical Writing	2	Civ. E. 52, Applied Mech. (Kinetics)	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Eng. 75, Applied Electronics	4	Elec. E. 78, Transient Analy.	3
Elec. Eng. 77, Elec. Network Analy.	3	Ind Eng. 86, Industrial Engin.	3
Mech. Eng. 79, Mech. Eng. Eng. Lab. I	2	Elec. Eng. 92, Prof. Sem.	1
Civ. Eng. 75, Fluid Mechanics	3	Technical Elective*	7 or 8
Technical Elective*	4	Non-Technical Elective (Bus. Law 70 or Psych. 86 recom- mended)	3
Non-Technical Elective (Am. Govt. 25 recommended)	3	*Elec. E. 80, Elec. Comm. II	
*Elec. Eng. 79, Elec. Communi- cations I		*Elec. E. 86, Power Syst. Netw.	
*Elec. Eng. 81, Adv. Elec. Mach.		*Elec. Eng. 84, Ind. Electronics	
		*Elec. Eng. 88, Comm. Netw.	
		*Elec. Eng. 90, Illumination	
		*Elec. Eng. 94, U.H.F. Tech.	
		*Elec. Eng. 96, Electromagnetic Engr.	
		*Elec. Eng. 82, Power Applications in Ind.	

MECHANICAL ENGINEERING

MAURICE E. BATES, *Adviser*

Mechanical engineering is that branch of the profession which, broadly speaking, covers the fields of heat, power, design of machinery, industrial management and manufacturing problems.

Building upon the foundation laid by the departments of mathematics, physics, and chemistry, the department of mechanical engineering undertakes to show the student how fundamental physical laws apply to this field of the profession. The courses selected give the student thorough training in the basic principles so that particular applications can be mastered in professional practice. Therefore, no attempt is made to give highly specialized instruction.

It must be realized that the modern engineer lives in a time of rapid social and technological change. Only the man who has had a well-balanced cultural and technical program of study can adjust quickly enough to the needs of a continually changing social order. The following curricula emphasize the fundamentals of the four M's of engineering; materials, methods, men, and money, a knowledge of which is vital to the modern engineer.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 27 and 28, Shop 6 credit hours

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Chem. 1, General	3	Chem. 4, General	4
Mech. Eng. 3, Descript. Geom.	2	Civ. Eng. 34, Appld. Mech. (Statics)	3
Mech. Eng. 59, Mat'l of Constr.	2	Mech. Eng. 72, Fund. of Metallurgy	3
Ind. Engin. 25, Prod. Processes	2	Military 26	2
Military 25	2		

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 25 or Psych. 26	3	Psych. 26 or Econ. 25	3
Civ. Engin. 52, Appld. Mech. (Kinetics)	3	Civ. Engin. 76, Fluid Mech.	4
Mech. E. 67, Mech. Instr. Lab.	1	Mech. Eng. 68, Kinematics	3
Mech. Eng. 63, Eng Thermo-dynamics	4	Mech. Eng. 64, Eng. Thermo-dynamics	3
Elec. E. 61, Principles	4	Elec. Eng. 62, Principles	4
Civ. Eng. 51, Strength of Mat'l.	4	Civ. Eng. 61, Testing of Mat'ls.	2

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mech. Eng. 75, Power Plants	3	Mech. E. 76, Ref. & Air Cond.	3
Mech. E. 77, Internal Combust. E.	3	Mech. E. 80, Mech. Eng. Lab.	2
Mech. Eng. 79, Mech. Eng. Lab.	2	Mech. E. 86, Adv. Mach. Des.	3
Mech. Eng. 83, Machine Design	3	Technical Elect.†	6
Mech. Engin. 85, Dynamics of Mach.	3	Non-Tech. Elect. (Bus Law 70 or Psych. 86, Ind. rec.)	3
Mech. Eng. 91, Sem.	1	†Mech. Engin. 82, Fluid Mach.	
Non-Technical Elect. (Am. Govt. 25 recommended)	3	†Mech. Engin. 88, Steady-Flow Mach.	
		†Mech. Eng. 90, Adv. Metallurgy	
		†Elec. Eng. 65, Ind. Electricity	
		†Ind. Engin. 86, Ind. Mgt.	

INDUSTRIAL ENGINEERING OPTION

W. H. WEAVER, *Adviser*

Industrial engineering is concerned with the engineering aspects of the organization, operation and management of manufacturing plants. It is based on the premise that the operation of a manufacturing plant is fundamentally an engineering activity. Consequently, the industrial engineering curriculum is built on a foundation of mechanical engineering. To the technical knowledge and scientific attitude developed through the study of engineering is added the study of certain courses in the humanities, in economics, and in management.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 5, or Psych. 26	3	Psych. 26 or Econ. 25	3
Mech. Eng. 65, Heat Engin.	3	Mech. Eng. 66, Heat Eng.	3
Civ. Eng. 53, Strength of Mat'l.	3	Civ. E. 52, Appld. Mech. (Kinetics)	3
Elec. Eng. 61, Prin. of Elec. Eng.	4	Elec. Eng. 62, Prin. of E. E.	4
Acct. 25, Prin. of Bus.	3	Acct. 26, Prin. of Bus.	3
Ind. Engin. 51, Ind. Mgt.	3	Mech. Eng. 68, Kinematics	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 75, Fluid Mech.	3	Ec. 79, Labor Prob.	3
Ag. Econ. 79, Statistics	3	Ind. Engin. 76, Time Study	3
Mech. Engin. 79, Lab. I	2	Ind. Engin. 78, Factory Pl.	2
Mech. Engin. 83, Mach. Design	3	Ind. Engin. 80, Budget Con.	3
Ind. Engin. 75, Job Evaluation	2	Ind. Engin. 82, Work Simplification	2
Ind. Engin. 77, Prod. Control	3	Ind. Engin. 92, Sem.	1
Elective	2-3	Elective	2-3

SCHOOL OF HOME ECONOMICS

HELEN S. MITCHELL, *Dean*

The School of Home Economics offers several curricula which are designed to prepare students for a variety of professions as well as for successful homemaking. Professional organizations such as the American Dietetic Association set educational standards for which students may qualify. Courses in various phases of home economics are open to men as well as women.

General education is the objective of the first two years for all students but electives for sophomore year may be chosen in line with the proposed field of specialization. The several curricula offered for the junior and senior years give an opportunity for specialization with some time for electives to further the objective of general education.

When registering for the sophomore year, each student should make a decision as to which home economics curriculum she intends to follow. Some change in emphasis may be made later, but the student is often at a disadvantage if a change in the field of specialization is made later in the college career.

The program of studies for the first two years is largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Chemistry 1, General	3	Chemistry 2, General	3
Foreign Language	3	Foreign Language	3
Home Ec. 1, Introduction	3	Home Ec. 2, Cloth. Select. & Constr.	3
Physical Education 7	2	Math. 8 or 12	3
Hygiene	1	Physical Education 8	2
¹ Elective	3		

¹ Elective to be chosen from the following:

Zoology 1, recommended for majors in Foods and Nutrition, Pre-research, or Child Development.

History 5, recommended for majors in Applied Art, Textiles and Clothing, and Merchandising.

Math. 7. May be followed by Math. 8, second semester.

Botany 1.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Literature	3	English 26, Literature	3
Economics 25, Elements	3	Psychology 26, General	3
Chem. 31, Organic	3	Chem. 32, Bact. 31, Zool. 1 or 35 or	3
Physical Education 27	2	Bact. 31 and 31A	4
¹ Electives	6	Home Ec. 30, Foods	3
		Physical Education 23	2
		¹ Elective	3

¹ One of the following electives may be taken during the sophomore year: Home Ec. 31, Applied Art; Home Ec. 26, Textiles. If neither is elected Home Ec. 61 or 62 should be elected junior year.

Other electives: Accounting 25, 26; Art 31, 34; Bacteriology 31 and 31A; Chem. 29 and 30; Physics 25, 26; Econ. 26; Government 25;; Sociology 28; Zoology 35; Language.

JUNIOR-SENIOR CURRICULA IN HOME ECONOMICS

A student may specialize in one of several fields of Home Economics during the junior and senior years. In consultation with her faculty adviser, each student will choose courses directly related to her objective. To qualify for a B.S. degree in Home Economics a student during the junior and senior years must have a minimum of 15 credits and not more than 42 credits in the School of Home Economics, 30 of which are in the major field. The following curricula are suggestive. Those interested in other types of professional work should consult with advisers about desirable electives. For students not interested in professional work, a more liberal choice of electives is possible.

CHILD DEVELOPMENT AND FAMILY LIFE EDUCATION

Students interested in child development, nursery school work and social service work should choose this curriculum. The University is affiliated with the Merrill-Palmer School in Detroit which specializes in education for home and family life. One or two outstanding students may be selected each year to study there for one semester of the senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 70, Child Developm't	3
Psych. 55, Educational	3	Home Ec. 80, Family	3
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 85, Nursery Sch. Mgt.	3	Home Ec. 83, Teaching	3
Home Ec. 81, Methods	3	Home Ec. 77, Household Mgt.	3
Home Ec. 95, Child Nutr.	3	Electives	9
Electives	6		

FOODS AND NUTRITION AND INSTITUTION MANAGEMENT

This curriculum prepares for the professional fields of hospital or administrative dietitian or nutritionist and meets the requirements of courses approved by the American Dietetic Association. This curriculum is also advised for those interested in home service and commercial demonstrating related to foods.

Bacteriology 31 and 31A and Zoology 35 should be elected sophomore year to satisfy requirements of the American Dietetics Association.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Food Selection	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Household Equip.	3
Home Ec. 81, Methods	3	Electives	9
Chem. 79, Biochemistry	4		
Acct. 25, Bus. Acct.	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 71, Retail Fd. Buy.	3	Home Ec. 77, Home Mgt.	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutr. Sem.	1
Home Ec. 91, Institution. Mgt.	3	Electives	11
Home Ec. 93, Experimental Fds.	3		
Elective	3		

PRE-RESEARCH IN NUTRITION

This curriculum is planned for the students who wish to prepare for graduate work in nutrition or biochemical research. The course should be planned with the advice of the Dean of the School.

Pre-research majors are advised to elect Physics 25 and 26, and take Chemistry 29 in place of Chemistry 31 in the sophomore year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Equipment	3
Chemistry 30, Quantitative	4	Electives	6
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 79, Biochemistry	4	Home Ec. 77, Home Management	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutrition Sem.	1
Home Ec. 93, Experimental Foods	3	Home Ec. 98, Special Problems	3
Home Ec. 95, Child Nutrition	3	Electives	9
Elective	3		

HOME ECONOMICS EDUCATION AND EXTENSION

Preparation for teaching demands the same basic courses whether a student plans to teach adults or 4-H club groups in Extension, or young people at the high school or junior high school level. In addition to courses required of all home economics students, certain electives are recommended for those planning for any form of teaching. Courses in speech and writing are important. Electives should be chosen in line with special interests or needs. Teachers should be ready to teach some subject other than home economics if demanded; extension workers need special work in rural sociology and adult education. Camp teaching or apprentice training is recommended between junior and senior year.

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Electives*	12
Electives*	9		

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Electives*	15
Electives*	12		

* It is suggested that the following courses be taken:

Home Ec. 81, Methods	Home Ec. 83, Student Teaching
Education 53, Tests & Mesrmts.	Home Ec. 62, Home Furnish.
Psych. 55, Educational	or Home Ec. 26, Textiles
Home Ec. 61, Clothing or Home	Home Ec. 60, Equipment
Ec. 31, Applied Art	Home Ec. 80, Family Life
Home Ec. 91, Institutional Mgt.	Home Ec. 70, Child Development
Home Ec. 93, Experimental Foods	

MERCHANDISING AND RETAILING

This curriculum is planned in cooperation with the School of Business Administration and provides an opportunity for girls interested in preparing for the merchandising field. The junior and senior curriculum includes courses in home economics and in business administration, and should be planned with the faculty adviser by the end of the freshman year if possible. Students choosing this program are expected to take Home Economics 31, Accounting 25, and Economics 26 in the sophomore year, and should plan on at least a year of in-service training after college.

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 26, Textiles	3
Home Ec. 61, Clothing	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Mktg. 54, Salesmanship & Mgt.	3
Mktg. 53, Mktg. & Mktg.		Electives	6
Problems	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 87, Tailoring	3	Home Ec. 77, Home Management	3
Mktg. 71, Retail Merchandising	3	Home Ec. 88, Dress Design	3
Mktg. 73, Advertising	3	Mktg. 73, Mktg. Research	3
Electives	6	Electives	6

TEXTILES, CLOTHING, AND RELATED ART

This curriculum is of interest to students who may wish to use clothing and related art in a general and aesthetic sense for their personal and family development. Students with ability and professional interest in the artistic and technical aspects of textiles, clothing, and related art are encouraged to go further in this field. They are expected to take Home Economics 31 and Home Economics 26 in the sophomore year. Art 31 is recommended.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 53, Nutrition	3
Home Ec. 61, Clothing	3	Home Ec. 62, Home Furnishing	3
Home Ec. 75, Ec. of Household	3	Electives	9
Home Ec. 81, Methods	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 88, Dress Design	3
Home Ec. 83, Teaching	3	Home Ec. 98, Problems	3
Home Ec. 87, Tailoring	3	Electives	9
Electives	6		

DIVISION OF MILITARY SCIENCE AND TACTICS
RESERVE OFFICERS' TRAINING CORPS

COLONEL WILLIAM N. TODD, JR., *P M S & T, Head*

Under act of Congress, July 2, 1862, the College was required to provide a two-year course in military instruction under a regular army officer. All able-bodied four-year male students are required by the University to take this course. Under act of Congress, June 3, 1916, as amended by act of Congress, September 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following World War I, under an act of Congress, July 19, 1918, the Reserve Officers' Training Corps was in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics. Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a horse cavalry unit. The cav-

alry unit continued training until June, 1943, at which time the Advanced Course ROTC was discontinued for the duration of World War II. From September, 1943 through June, 1946 the Reserve Officers' Training Corps conducted courses in the basic course, branch immaterial only. In September, 1946, the Advanced Course ROTC was reinstated with an Armored Cavalry unit and an Air Force unit.

The primary objective of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions and to produce junior officers who have the qualifications and attributes essential to their progressive and continued development as officers in the Army of the United States or the United States Air Force. It is intended to attain the objective during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers.

All male candidates for a degree in the four-year course, except veterans of World War II, must take the basic course of at least three hours a week of military training for two years. Veterans of World War II are not required to take the basic course, but are eligible to apply for the Advanced Course.

Specialization by air or service begins in the freshman year. The courses of instruction include theoretical and practical work in all phases of military science, such as military organization, hygiene and first aid, weapons, maps, military administration, military law and boards, and leadership, drill and exercise of command. Approximately forty per cent of the course is classroom and sixty per cent practical work.

Students who are approved by the president of the University and the professor of military science and tactics or the professor of air science and tactics may elect to take the advanced course in their junior and senior years and may enroll in either the armored cavalry unit or air force unit. Advanced students will be commissioned in the organized reserve corps, in the respective branch, upon graduation. Honor graduates are offered a commission as 2nd Lieutenants in the Regular Army or Regular Air Force. Other graduates may elect to serve for one year extended active duty and by this means win a commission in the Regular Army or Regular Air Force.

The advanced course, in either branch, consists of at least five hours per week, and an advanced summer camp of about six weeks during the summer vacation between the two years of the advanced course. Students taking the advanced course are paid by the Department of the Army or Department of the Air Force, at a rate

equivalent to the value of the garrison ration, which at the present time is 90c per day, or about \$27.00 per month. Advanced students are given an allowance of \$90.00 toward the purchase of a uniform to be retained by the individual. Advanced students are paid the pay of the 7th grade (private) while at summer camp.

All basic students are provided with a complete officers' uniform by the Department of the Army or the Department of the Air Force. A deposit of \$30.00 is required to cover cost of loss or damage to any articles issued.

DIVISION OF PHYSICAL EDUCATION

W. P. McGUIRK, *Head*

The Division of Physical Education includes the Departments of Athletics, Physical Education for Men, and Physical Education for Women. It offers one major, that in Physical Education for Men.

INTERCOLLEGIATE ATHLETICS

W. P. McGUIRK, *Director*

The following men are in charge of the coaching of the intercollegiate teams:

Thomas W. Eck, Head Coach of Football, and in charge of Publicity; Lorin E. Ball, Assistant Coach of Football and Coach of Basketball; L. L. Derby, Coach of Track and Cross Country; L. E. Briggs, Coach of Soccer; Joseph R. Rogers, Jr., Coach of Swimming; Earl Lorden, Assistant Coach of Football and Coach of Baseball; Sidney W. Kauffman, Assistant Director of Athletics and in charge of Intramural Sports; Stanley F. Salwak, Coach of Tennis and Trainer.

PHYSICAL EDUCATION FOR MEN

H. M. GORE, *Adviser*

The work in the department of physical education for men includes required and elective physical fitness activity courses for all four years; and the opportunity to major the last two years in physical education; or to minor in physical education, teacher-coaching or physical recreation.

The rugged physical fitness activities courses for men, which are required the first two years and urged upon the upperclassmen are planned to help every man student to at least meet accepted reasonable minimum standards of physical fitness; and then, through regularity and continuity of progressively planned exer-

cise, maintain good physical condition throughout his college career. Every freshman must pass a reasonable physical fitness rating and learn to swim.

The majors in physical education are so planned as to qualify volunteer and professional leaders and instructors in physical education, athletics, health and safety education, and physical recreation for service and adult organization, organized summer camps, public service and industrial groups, schools and colleges.

The outline of the physical education major follows. It is contemplated that Physical Education majors will be well trained in general scientific and cultural subjects as well as to be themselves physically fit. They are urged to elect advanced military and courses in education. Those planning on teacher-coaching should take additional work in their particular subject matter fields.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 7, Algebra and Trigonometry	3	Mathematics 8, Algebra	3
Physical Education 5, Survey	3	Physical Education 22, First Aid	3
Military 1	3	Military 2	2
Physical Education 3, Activity	1	Physical Education 4, Activity	1
<i>Elect two:</i>		<i>Elect two:</i>	
Chemistry 1, General	3	Chemistry 2, General	3
Botany 1, Introductory	3	Zoology 1, Introductory	3
History 5, Mod European Civiliz.	3	History 6, Mod. European Civiliz.	3

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Literature	3	English 26, Literature	3
Economics 25, Elements	3	Psychology 26, General	3
Physical Education 45, History	2	Physical Education 42, Aquatics and Water Safety	3
Physical Education 33, Activity	1	Military 26	2
Physical Education 43, Officiating	1	Elective* (one to be a science)	6
Military 25	2	Phys. Ed. 34, Activity	1
Electives* (one to be a science)	6		

* Electives to be selected from the following:

Bacteriology 31, 31A	Government 25
Chemistry 29, 31, 32	Physical Ed. 57
Physics 25, 26	History
Zoology 35	Language

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Physical Ed. 53, Elem. Schools	3	Physical Ed. 54, Special Methods	3
Physical Education 51, Coaching	3	Physical Ed. 52, Coaching	3
Physical Education 63, Activity	1	Physical Ed. 76, Anatomy	3
Electives	9	Physical Ed. 64, Activity	1
		Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Physical Ed. 71, Spec. Problems or	3	Physical Ed. 72, Special Prob. or	3
Education 85, Prac. Teach.	3	Education 85, Pract. Teach.	3
Physical Ed. 55, Administration	3	Physical Ed. 78, Kinesiology	3
Physical Ed. 83, Activity	1	Physical Ed. 86, Safety Ed.	2
Electives	9	Physical Ed. 84, Activity	1
		Electives	9

To comply with state certification requirements in education, physical education majors should take Education 52, Methods; Education 85, Practice Teaching, Education 88, Curriculum, and Educational Psychology 55. It is recommended, for elective education courses, that Education 51, History, Education 66, Audio-Visual Aids, or Education 83, Secondary, be taken.

PHYSICAL EDUCATION FOR WOMEN

RUTH J. TOTMAN, *Adviser*

The courses in physical education for women are planned to provide recreative activity, to develop body grace and efficiency, and to increase health and vigor. No major is available.

The first and second year women students are required to take physical education three times a week and are given two credits for each semester of satisfactory work. Third and fourth year students may elect Physical Education 61-62 or 81-82.

A physical examination is given before classes begin in the fall. Girls who are restricted from unlimited activity are placed in classes suitable to their ability. Girls who are restricted from all class activity are assigned to rest periods three times a week and receive their regular physical education credit for satisfactory attendance. A similar rest program is substituted for the regular activity program when girls are temporarily incapacitated.

DIRECTORY OF COURSES

This section contains a list of courses offered in the regular sessions of the University. Course descriptions are arranged alphabetically according to subject matter fields. If any course cannot be found readily, refer to the General Index in the back of the catalogue. A separate bulletin will outline those available during the summer. The University reserves the right to withdraw any course for which an insufficient number of students enroll.

Courses are designated by numbers as follows: freshman 1-24 inclusive; sophomore 25-49 inclusive; junior 50-74 inclusive; senior 75-99 inclusive. Odd numbers designate courses given in the first semester, even numbers those offered during the second. Credit is indicated in terms of semester hours. Where possible, the class schedule follows the course description. A complete schedule of class hours is published at the beginning of each semester.

Students are referred to the section on Divisions of Study and Curricula for a statement of graduation requirements and majors available.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

PROFESSOR LINDSEY, PROFESSOR BARRETT,

ASSISTANT PROFESSOR RUSSELL, MR. CALLAHAN

26. (II) ECONOMICS OF AGRICULTURAL PRODUCTION.—This course considers the principles of production economics. An analysis of specialization, comparative advantage, diminishing, constant, and increasing costs and returns applied to the individual establishment as well as to the nation. A careful study of the combination of the factors of production is made considering the individual's adjustment when operating under monopolistic competition, laissez-faire, and monopoly. Finally, dynamic and static factors are considered in relation to their effects on the individual's production, on the economy of cities and nations, and on the international economy.

3 class hours.

8:00-8:50 M. W. F.

Prerequisite, Economics 25.

Credit, 3.

MR. BARRETT.

55. (I) MARKETING FARM PRODUCTS.—Not open to students who have taken or are taking Marketing 53. An analysis of present and past systems of assembling, transporting, distributing, and grading agricultural products. Such aspects as the adjustment of production and consumption, price formation, channels of distribution, price differentials and margins, public policy, market reporting and forecasting, and a study of the marketing of major agriculture products are considered. Geographic, future, and quality differentials are studied from the agricultural and commercial standpoint. A field trip may be arranged.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

THE DEPARTMENT.

56. (II) THE FUNDAMENTALS OF COOPERATION.—A study of the philosophy and principles of cooperation in Europe and in the United States. The history of cooperation, legal consideration, management, financing, membership relations, methods of formation, sales methods and policies are given full attention. Progress in the cooperative marketing of different agricultural products is studied. One field trip required.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. CALLAHAN.

57. (I) AGRICULTURAL CREDIT AND LAND APPRAISAL (1950-51).—A study of the development, use, functions, and operations of public and private credit institutions which are available to agriculture. Special emphasis is given to the practical aspects of credit policy and land appraisal. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

71. (I) AGRICULTURAL ECONOMIC THEORY (1951-52).—The course is a comparative and critical study of the significant contributions of the leading economists to the theory of agricultural economics from the time of Adam Smith to the present. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

75. (I) FARM ORGANIZATION AND MANAGEMENT.—This course analyzes the functions of the farmer as a business proprietor. Both the external and internal economic forces affecting the farm business are considered, such as selection and combination of factors of farm production, choice and combination of farm enterprises, the economical use of funds, the nature of farming costs, adjusting farm production to markets and prices, and the management of equipment and labor.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. BARRETT.

Prerequisite, Agricultural Economics 26.

76. (II) ADVANCED FARM ORGANIZATION AND MANAGEMENT.—The use of farm records and accounts as a basis for planning and budgeting is emphasized. Measures of success and factors in success in farming, and work simplification as applied to efficient farm techniques are considered. The last part of the course will be given over to the specific study of selected farms and the practical application of the principles and practices already discussed. Field trips are required at an estimated cost of not over five dollars.

1 class hour; 1 4-hour laboratory period.

Credit 2.

10:00-10:50 Th.; 1:00-4:50 M.

Mr. BARRETT.

Prerequisite, Agricultural Economics 75.

78. (II) PRINCIPLES AND PROBLEMS OF LAND ECONOMICS.—A study of the major contributions by outstanding economic writers to theoretical land economics; a review of American land policies; a presentation of the principles, techniques, and objectives involved in modern

land use planning; and a discussion of contemporary land problems in the United States.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

79. (I) and (II) PRINCIPLES AND METHODS OF STATISTICS.—Methods of collecting, analyzing, interpreting, and presenting statistical data. Sampling principles, averages, dispersion, measures, index numbers, time series and simple correlation are specific fields covered. Practical problems in statistical analysis are given in the laboratory.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LINDSEY, Mr. RUSSELL.

80. (II) ADVANCED STATISTICS.—This course is primarily devoted to linear and curvilinear multiple correlation analysis. Machine and short-cut graphic methods are used. Some time will also be devoted to probability and analysis of variance.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 1:00-2:50 M. F.

Mr. LINDSEY, Mr. RUSSELL.

83. (I) ADVANCED FARM OPERATION.—For seniors specializing in agriculture; others by permission of instructor. A study of the efficiency of operations on a specific farm.

3 hours or equivalent.

Credit, 3.

Hours by arrangement.

Mr. BARRETT.

89. (I) 90. (II) SEMINAR IN AGRICULTURAL ECONOMICS.—A study of special problems in agricultural policy, agricultural institutions, market and price analysis.

Hours by arrangement.

Credit, 1-3.

The DEPARTMENT.

AGRONOMY

Professor COLBY, Associate Professor DICKINSON, Assistant Professor

THAYER, Assistant Professor EVERSON, Mr. ZAK, Mr. CORNISH,

Mr. PARSONS.

2. (II) SOILS.—This is an elementary course relating soils and their management to crop growth. This course is designed to give the student a broad background in soil science and its direct application to practical field problems. The course itself is presented with the object of introducing to the student the properties of soils and their influence upon the production of crops. The laboratory work consists of investigation of the fundamental characteristics of soil and basic principles of fertilizer and liming practices.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 W. or Th.

Mr. EVERSON, Mr. ZAK, Mr. RUSSELL.

51. (I) FIELD CROPS.—A study of the field crops of the United States which will include their uses and improvement, with their soil and

climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, fertilizing, seeding methods, tillage, disease and insect control, and to methods of harvesting and storage. As an individual problem, each student must make a detailed plan of crop production for the actual conditions of some New England farm.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Credit, 3.

Mr. THAYER.

52. (II) SOIL UTILIZATION.—The relationship of climate and native vegetation to the broader aspects of soil formation is described. Man's use of land resources is connected to show how the agricultural background of settlers has been active in soil use and abuse. Soil erosion control and its significance to permanent agriculture is considered.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. EVERSON.

57. (I) SOIL FORMATION.—The first part of this course considers those physical, chemical, biological, climatic and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States is discussed.

3 class hours.

Credit, 3.

Mr. EVERSON.

77. (I) CROP IMPROVEMENT.—Theory and practice of the improvement of field crops by breeding and selection.

2 class hours; 1 2-hour laboratory period.

Hours by arrangement.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Agronomy 51, Pomology 52, Zoology 53.

78. (II) FERTILIZERS AND SOIL FERTILITY.—The primary purpose of this course is to relate soils and fertilizers to plant growth. Studies are made of fertilizer practices in the United States and Europe. In the early part of the course consideration is given to the history of fertilizer development, with special emphasis upon early discoveries and causes of failure in early research. Later in the course, studies are made of factors which relate fertilizers and soils to plant growth. Fertilizer formulation technology and practice are considered in detail in the laboratory phase of this course.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Credit, 3.

Mr. EVERSON.

79. (I) SOIL PHYSICS.—For seniors specializing in agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. EVERSON.

81. (I) 82. (II) SPECIAL PROBLEMS IN AGRONOMY.—For seniors specializing in agronomy. This course is designed to acquaint students with agronomic research methods and practical agronomic procedures. 3 2-hour laboratory periods.

Credit, 3.
Mr. SIELING.

84. (II) SOIL CHEMISTRY.—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils are discussed and related to plant nutrition and microbiological activities. Colloidal aspects of soil chemical reactions and soil-plant interrelationships will be studied.

3 class hours.

Credit, 3.
Mr. SIELING.

Prerequisites; Chemistry 29; Botany 68; Agronomy 57.

84B. (II) SOIL CHEMISTRY LABORATORY.—Primarily for seniors majoring in agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 84.

2 3-hour laboratory periods.

Credit, 2.
Mr. SIELING.

Prerequisites, Chemistry 29, 30; Botany 68; Agronomy 57.

Agrostology.

53. (I) AGROSTOLOGY.—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highway, airport and cemetery turf.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. DICKINSON.

56. (II) AGROSTOLOGY.—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises are arranged.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. DICKINSON.

ANIMAL HUSBANDRY

Professor RICE, Associate Professor FOLEY, Assistant Professor COWAN,
Assistant Professor HALE, Mr. ELLIOT

1. (I) AGRICULTURE.—This course is designed to provide the student with a perspective of the whole field of agriculture, both in the old and the new world. It will endeavor to orient the student relative to the position of agriculture in relation to other primary and secondary industries and to personal and professional services. The course will introduce the student briefly to some of the physical characteristics, economic elements, social and political factors concerned with agricultural pursuits

and rural living. It will attempt to assist the student in finding his or her proper niche in the broad field of agriculture.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 M. or F.

Mr. FOLEY.

26. (II) BREEDS OF LIVESTOCK AND DAIRY CATTLE JUDGING.—This course considers the economic desirability of thirty breeds of domestic livestock. The origin, history, characteristics and distribution of the breeds of cattle, sheep, swine, and horses commercially important in the United States will be discussed. During April and May trips will be made on Saturdays to outstanding herds of dairy cattle in New England. The three highest ranking students in advanced judging will represent the College in the Intercollegiate Dairy Cattle Judging Contest at the Eastern States Exposition in Springfield, in September.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; 3:00-4:50 F., Feb. and Mar.; 8:00-12:00 S., Apr. and May.

Mr. ELLIOT.

51. (I) NUTRITION OF FARM ANIMALS.—This course will present the fundamental principles of animal nutrition together with the identification, composition, properties and uses of the common feed stuffs. The application of these basic principles in calculating balanced rations for all classes of livestock will be stressed, followed by practical feeding problems assigned outside the classroom. Feeding practices in use with the university livestock will be analyzed and demonstrated.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

8:00-8:50 M. W. F.; 3:00-4:50 W.

Mr. ARCHIBALD.

53. (I) ELEMENTS OF MEAT PACKING.—For department majors only. The lectures will discuss the development of the modern packing industry, the history of meat inspection, the principles of meat preservation and the opportunities in this field. Laboratories include the classification of cattle, calves, sheep, and swine into proper market classes and grades and slaughtering and dressing operations with animals provided by the university farm. Wholesale and retail cuts are prepared. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 1:00-2:50 or 3:00-4:50 M. F.

Mr. HALE.

54. (II) MEAT PROCESSING.—For students not majoring in animal husbandry, by permission of the instructor. A few periods will be devoted to a discussion of the meat packing industry and to the preserving and care of meat products. The remainder will be spent on the classification of meat animals with practice slaughtering and the making of wholesale and retail cuts with stress on identification of retail cuts. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 Tu. Th.

Mr. ELLIOT.

56. (II) BEEF AND SHEEP PRODUCTION.—This course considers the historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially New England. Consideration will be given to types of production; systems and methods of feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and the treatment and prevention of external and internal parasites as well as common ailments.

2 class hours; 1 2-hour laboratory period.
8:00-8:50 Tu. Th.; 3:00-4:50 M. or F.

Credit, 3.
Mr. COWAN.

56A. (II) GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.—This course is given in conjunction with Animal Husbandry 56 and consists of practice in judging and selecting beef, cattle, sheep, horses, and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments. The five highest ranking students in judging will represent the university in the Intercollegiate Livestock Judging Contest at Eastern States Exposition the succeeding fall.

1 4-hour laboratory period.
8:00-12:00 S.

Credit, 1.
Mr. COWAN.

72. (II) MEAT JUDGING.—This course deals with the classification, grading and judging of carcasses and cuts of beef, veal, lamb and pork. Class work will be carried on at Amherst and nearby packing and distributing plants. The team to represent the university in the Intercollegiate Meat Judging Contest held in connection with the Eastern States Exposition will be chosen from students in this course.

1 4-hour laboratory period.
1:00-4:50 Tu.

Credit, 1.
Mr. HALE.

Prerequisites, Animal Husbandry 51 and 53 or permission of instructor.

74. (II) ADVANCED MEATS.—This course deals with the advanced techniques in preparing, preserving, and utilizing the various meat products from cattle, sheep and swine.

2 2-hour laboratory periods.

Credit, 2.
Mr. HALE.

Prerequisite, Animal Husbandry 53 or 54 and permission of instructor.

75. (I) ANIMAL BREEDING.—This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and theories of modern genetics, and to show how such knowledge may be utilized through genetic analysis, selection, and systems of breeding for the creation of more beautiful and more efficient animal types.

3 2-hour periods.
1:00-2:50 M. W. F.

Credit, 4.
Mr. RICE.

Prerequisite, Zoology 53.

76. (II) ANIMAL BREEDING TECHNIQUES.—This course deals with the practical application of the principles of physiology of reproduction and selection to the improvement of farm animals. It includes practice in semen collection and evaluation, artificial insemination procedures and

techniques, and in the study of genitalia at different stages of estrus and gestation periods in live and dead animals. Methods of easing and aiding parturition will be discussed and observed.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 Tu. or Th.

Mr. COWAN.

78. (II) DAIRY CATTLE PRODUCTION.—This is an intensive course covering all phases of dairy cattle and milk production. It affords an opportunity to seek the solution to the economic, nutritional, genetic, and managerial problems concerned in successful dairying.

4 2-hour laboratory periods.

Credit, 4.

8:00-9:50 Tu. Th.; 1:00-2:50 W., and Tu. or Th.

Mr. FOLEY.

79. (I) HORSE AND SWINE PRODUCTION.—This course is the same as Animal Husbandry 56 except that it deals with horses and swine instead of beef and sheep.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 M. or F.

Mr. COWAN.

79A. (I) ADVANCED LIVESTOCK JUDGING.—This course is devoted entirely to beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments and a team will be selected to represent the University at the Intercollegiate Livestock Judging Contest at the International Livestock Exposition in Chicago and at any other contests in which the University may occasionally or regularly participate.

1 4-hour laboratory period, first half of semester.

Credit, 1.

8:00-12:00 S.

Mr. COWAN.

Prerequisite, Animal Husbandry 56A or permission of instructor.

81. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 W. or Th.

Mr. FOLEY.

82. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 Tu. or Th.

MR. RICE.

83. (I) ADVANCED MEAT JUDGING.—This course is a continuation of Course 72. The team to represent the University in the Intercollegiate Meats Judging Contest held in connection with the International Livestock Exposition will be chosen from students in this course.

1 4-hour laboratory period, first half of semester.

Credit, 1.

1:00-4:50 Tu.

MR. HALE.

Prerequisite, Animal Husbandry 72 and permission of instructor.

91. (I) GENETICS AND EUGENICS.—This course, open to students other than those specializing in animal husbandry, deals with the general problems concerned in human reproduction and inheritance. The main topics studied will consist of the physiology of reproduction, the physical basis of inheritance, and the mode of transmission of human characteristics. Consideration will also be given to such questions as the causes of variation, the relative importance of genetic and environmental influences,

the mechanism of sex determination as well as population trends, differential birth rates, sterilization, and kindred eugenic problems.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.

MR. RICE.

BACTERIOLOGY AND PUBLIC HEALTH

Professor BRADLEY, Associate Professor GARVEY, Associate Professor FRANCE, Assistant Professor PERRIELLO, Assistant Professor LIPOVSKY, Assistant Professor ROBERTSON, Mr. LARKIN in cooperation with Dr. WALTER W. LEE, State District Health Officer; Mr. ——— and Mr. ERNEST A. SNOW of the Division of Sanitary Engineering of the Massachusetts Department of Public Health.

31. (I) and (II) INTRODUCTORY BACTERIOLOGY. LECTURES AND DEMONSTRATIONS.—Designed to present to students interested in general science, agriculture, horticulture, and home economics the fundamental concepts of bacteriological science; make microorganisms real and significant; and demonstrate their importance in the problems of agriculture, general science, industry, public health, and medicine. This course is designed to accompany Bacteriology 31A, but may be elected without it. When elected separately this course will not satisfy the sophomore science requirement and cannot be offered as a prerequisite for other advanced courses in bacteriology.

2 class hours.

12:00-12:50 M. F. or Tu. Th.

Credit, 2.

MR. BRADLEY or MR. LIPOVSKY.

31A. (I) and (II) INTRODUCTORY BACTERIOLOGY. LABORATORY.—The work covers the use and care of the compound microscope, the preparation of culture media, methods of sterilizing equipment, the isolation and aseptic handling of pure cultures, simple and differential staining, bacterial classification and differential studies on type species of pathogenic and non-pathogenic bacteria. Designed to accompany Bacteriology 31.

2 2-hour laboratory periods.

Credit, 2.

MR. FRANCE, MR. LIPOVSKY, or MR. LARKIN.

Prerequisite, Bacteriology 31, previously or concurrently.

51. (I) 52. (II) ADVANCED BACTERIOLOGY.—A continuation of introductory bacteriology. Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The identification and differentiation of bacterial species by morphological, cultural, physiological, and serological studies; disinfectants and antibiotics. The combined courses give to the student not only a comprehensive picture of various forms of existing bacteria but develop a specialized technique for their cultivation, isolation, and identification.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 Tu. Th.

MISS GARVEY or MR. LIPOVSKY.

Prerequisite, For 51, Bacteriology 31A; for 52, Bacteriology 51.

54. (I) and (II) WATER AND SEWAGE BACTERIOLOGY.—Elementary bacteriology with emphasis placed upon the importance of bacteria found

in water and sewage. Work will include routine analysis used in the examination of water and sewage and in the laboratory control of water and sewage treatment plants.

2 3-hour laboratory periods.

Credit, 3.

2:00-4:50 Tu. Th.

Mr. PERRIELLO.

Prerequisite, Civil Engineering 77 or permission of the instructor.

55. (I) FUNDAMENTALS OF SOIL MICROBIOLOGY.—This course is designed for students majoring in agricultural and related fields. Subjects included will be: fundamental laboratory procedures and techniques; quantitative and qualitative microbiological analyses of various types of soils; studies on the carbon and nitrogen cycles as affected by soil microorganisms.

2 3-hour laboratory periods.

Credit, 3.

Mr. FRANCE.

81. (I) GENERAL APPLIED BACTERIOLOGY.—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air.

1 class hour; 2 3-hour laboratory periods.

Credit, 4.

1:00-3:50 M. F. or 1:00-3:50 W.; 9:00-11:50 S.

Mr. FRANCE.

Prerequisite, Bacteriology 51 or permission of the instructor.

82. (II) FOOD BACTERIOLOGY.—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation and spoilage of foods, (2) the sanitary examination of foods, (3) the causes of food poisoning, and (4) microbiological assays.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F. or Tu. Th.

Miss GARVEY or Mr. LIPOVSKY.

Prerequisite, Bacteriology 51 or permission of the instructor.

85. (I) BACTERIOLOGY (IMMUNOLOGY).—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quantitative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F.

Miss GARVEY.

90. (II) SANITARY BACTERIOLOGY.—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies.

1 4-hour and 1 2-hour laboratory period.

Credit, 3.

1:00-4:50 M., 1:00-2:50 F.

Mr. FRANCE.

Prerequisite, Bacteriology 81.

92. (II) CLINICAL LABORATORY METHODS.—This course is designed for students majoring in medical technology. The purpose of the course is to familiarize the student with routine clinical laboratory procedures. 1 4-hour laboratory period. Credit, 3.
1:00-4:50 W., 3:00-4:50 F. Mr. FRANCE.
Prerequisites, Bacteriology 85; Zoology 35, 69.

93. (I) 94. (II) PROBLEMS.—Qualified seniors who have obtained permission from the department may arrange for independent work on special problems in bacteriology.

Credit, 3.
THE DEPARTMENT.

Public Health

61. (I) 62. (II) GENERAL AND COMMUNITY SANITATION.—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

3 class hours. Credit, 3.
9:00-9:50 Tu. Th., 12:00-12:50 F. or 10:00-10:50 M. W. F.
Mr. BRADLEY or Mr. PERRIELLO.

63. (I) INDUSTRIAL HYGIENE AND SANITATION.—A comprehensive study of the practices and principles of industrial processes which may constitute problems in sanitation; industrial wastes, smoke abatement, and the health of the worker. Subject matter includes organization of programs and the formation of policies for the inspection of sanitary and mechanical facilities of factories, food processing plants and other industries.

3 class hours. Credit, 3.
Mr. PERRIELLO.

64. (II) MICROSCOPY OF WATER.—A study of microscopic forms of life exclusive of the bacteria. Counting and control of plankton in potable waters. Elements of limnology.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 8:00-9:50 or 10:00-11:50 W. Mr. SNOW.
Prerequisite, Bacteriology 31A.

66. (I) and (II) PRINCIPLES OF SANITATION.—The application of sanitary engineering and related sanitary sciences to health problems in the environment of urban and rural communities.

2 class hours. Credit, 2.
11:00-11:50 Tu. Th. Mr. PERRIELLO.
Prerequisite, Civil Engineering 77 or permission of the instructor.

84. (II) PUBLIC HEALTH ADMINISTRATION.—Admission by approval of the instructor. The organization, function, and administration of governmental health agencies; the relationship of official and volunteer health agencies; preparation and presentation of lectures, demonstrations,

and exhibits. Public health laws, regulations, and sanitary codes, their origin and enforcement.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.

Mr. PERRIELLO.

86. (II) FIELD STUDIES IN SANITATION.—Trips will be taken into the field for the observation of public health practices in sewerage; sewage treatment and disposal; the production and purification of public water supplies; housing and slum clearance; insect and rodent nuisances; milk production, handling, and distribution; garbage and refuse collection and disposal; slaughter houses and rendering plants; cold storage warehouses; and bakery and restaurant sanitation. A comparative study of urban and rural services will be made. Although transportation will be furnished, students are expected to finance their own meals.

1 class hour; 1 4-hour laboratory period.

Hours by arrangement.

Prerequisites, Public Health 61 and 62.

Credit, 2.

Mr. BRADLEY.

88. (II) EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.—Admission by approval of the instructors. Consideration of the factors involved in the spread of infections; a detailed discussion of the communicable diseases, their distribution, cause, epidemiology, and means of prevention and control. The use of vaccines, serums and drugs for prevention and treatment. Mass immunization programs.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. LEE.

BOTANY

Professor KOZLOWSKI, Professor TORREY, Associate Professor HODGE, Assistant Professor BANFIELD, Assistant Professor LIVINGSTON, Mr. SPENCER,† Mr. PUTALA, Mr. ANDERSON, Mr. BRICKNELL.

1. (I) and (II) INTRODUCTORY BOTANY.—The course sets forth a body of facts dealing with the morphology and physiology of plants which is not only a foundation for future professional work in biological science, but of intrinsic value to the educated layman. The topics of seed germination, ecological adaptations, floral structures, taxonomy, botanical history, cytology, wood-anatomy, plant physiology, and plant reproduction receive appropriate elementary treatment. The lectures attempt to interpret the facts of plant structure and function in the light of the major biological principles.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. TORREY.

25. (I) CRYPTOGAMIC BOTANY.—Selected forms typifying the slime-molds, bacteria, algae, fungi, lichens, liverworts, mosses and fernworts. The course has a two-fold purpose: (1) it is intended for students who desire to extend their knowledge to the principal branches of the plant kingdom, thus rounding out a general course of which Course 1 constitutes

† On leave of absence.

the first part; (2) it is also planned as an introduction to certain advanced courses for which it is prerequisite.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. SPENCER.

Prerequisite, Botany 1.

26. (II) SPRING FLORA.—Designed primarily to acquaint the student with the local spring flora through the identification of the commoner tracheate plants (lycophods, horsetails, ferns, gymnosperms, angiosperms) and the families they represent. In addition, laboratory and field work will include the study of native woody plants in the winter condition; the techniques of collection; the use of a standard manual in the identification of plants; and the preparation of a representative herbarium. The course is designed for students majoring in botany, forestry, floriculture, recreational leadership, and wildlife management. Enrolment limited to 40. Expense of required materials approximately \$20.

1 class hour; 2 2-hour laboratory periods.

9:00-9:50 Tu.; 1:00-2:50 Tu. Th. or 1:00-2:50 W. F. Credit, 3.
Mr. HODGE.

Prerequisite, Botany 1; Botany 25 recommended.

28. (II) PLANT PHYSIOLOGY.—Only for students intending to major in forestry. The processes occurring in plants with special emphasis on tree physiology and its relation to forestry problems.

3 class hours.

Credit, 3.
Mr. KOZLOWSKI.

51. (I) PLANT PATHOLOGY.—A basic course in plant pathology dealing with the nature, cause and control of plant disease. Particular attention is given to disease symptoms, the phenomena of infection and of parasitism, the sources of inoculum, the agents of disease transmission, the relation of environment to disease incidence and development and to general principles of plant disease control. The laboratory phase is devoted to intensive study of a relatively few representative diseases induced by bacteria and fungi of the various classes.

1 class hour; 2 2-hour laboratory periods.

9:00-9:50 W.; 3:00-4:50 Tu. Th. Credit, 3.
Mr. BANFIELD.

52. (II) ADVANCED PLANT PATHOLOGY (1950-51).—An extension of Course 51. The objective is that of providing the student with a general knowledge of the more common and representative plant disease problems. Students are granted the option in the laboratory of specializing in disease problems in their major field of interest. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

9:00-9:50 W.; 3:00-4:50 Tu. Th. Credit, 3.
Mr. BANFIELD.

Prerequisite, Botany 51.

53. (I) FALL FLORA.—This course, a continuation of Botany 26, is designed for those students in the several fields of natural history who desire a fuller knowledge of the local flora than can be gained in the Spring. Emphasis will be placed on the identification of important families and species of flowering plants of the late summer and fall and on the thorough use of Gray's Manual of Botany. Primarily a field and

laboratory course, the first part of the semester will be devoted to intensive collecting in the field followed by identification of these collections in the laboratory.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. HODGE.

Prerequisite, Botany 26.

58. (II) MICROTECHNIQUE.—A course in the preparation of microscopic mounts including the celloidin and paraffin methods and involving the use of microtomes and of differential stains. Enrolment limited to ten students.

2 2-hour laboratory periods.

Credit, 2.
Mr. TORREY.

1:00-2:50 Tu. Th.

Prerequisite, Botany 25.

59. (I) 60. (II) THE ANGIOSPERMS (1950-51).—Alternate with Courses 61 and 62. The angiosperms are here treated from the standpoints of their structure and evolution, their taxonomy, their habits and distribution, and their economic or other special appeal to man's interests. Representatives of the dominant families, both temperate and tropical, are studied in the laboratory. The course is designed for students who want a broad knowledge of the flowering plants of the world.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. TORREY.

Prerequisite, Botany 1.

61. (I) 62. (II) THE COMPARATIVE ANATOMY OF GREEN PLANTS (1951-52).—Alternate with Courses 59 and 60. The first semester is devoted to algae and mosses; the second to tracheates, including the extinct forms.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. TORREY.

10:00-10:50 M. F.; 1:00-2:50 W.

Prerequisite, Botany 25.

63. (I) COMPARATIVE MORPHOLOGY OF FUNGI—BASIDIOMYCETES AND FUNGI IMPERFECTI (1951-52).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. BANFIELD.

9:00-9:50 F.; 3:00-4:50 M. F.

64. (II) COMPARATIVE MORPHOLOGY OF FUNGI—PHYCOMYCETES AND ASCOMYCETES (1951-52).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. BANFIELD.

9:00-9:50 Tu.; 10:00-10:50 Th.; 3:00-4:50 M.

66. (II) GENERAL MYCOLOGY.—A survey course in mycology designed to acquaint the student with the various classes of fungi, the life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, their utilization in industrial fermentations. The laboratory phase is devoted to a study of common representative forms and practice in the use of keys for their identification.

1 class hour; 2 2-hour laboratory periods.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
MR. BANFIELD.

67. (I) 68. (II) INTRODUCTORY PLANT PHYSIOLOGY.—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth. Topics include colloidal systems, osmotic phenomena, absorption, transpiration, and internal water relations of plants, photo-synthesis, fat and protein synthesis, digestion, translocation, respiration, and growth. This is a basic course for students planning for advanced work in any branch of plant science.

1 class hour; 2 2-hour laboratory periods.
1:00-1:50 W.; 3:00-4:50 M. W. or Tu. Th.

Credit, 3.

MR. KOZLOWSKI.

75. (I) METHODS IN PLANT PATHOLOGY (1950-51).—A course in the general techniques and specialized methods used in the investigation of plant diseases, including isolation, culture and pathogenicity studies of representative plant pathogenes, the preparation and sterilization of various culture media, elementary staining and histological techniques, the use of the microscope, study of fungicides, and training in elementary photographic procedures. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.
2:00-2:50 Tu.; 10:00-11:50 Tu.; 3:00-4:50 F.
Prerequisite, Botany 51.

Credit, 3.
MR. BANFIELD.

77. (I) 78. (II) ADVANCED PLANT PHYSIOLOGY (1951-52).—Advanced study in physiology. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.
Hours by arrangement.
Prerequisites, Botany 67, 68; Chemistry 51, 52.

Credit, 3.
MR. KOZLOWSKI.

81. (I) PLANT ECOLOGY.—A general survey of the relationship of plants to their environment including a study of environmental factors (autecology)—soil, water, temperature, light, atmosphere, and the biotic factors—and of plant communities (synecology) with special emphasis on the structure and succession of plant communities in North America.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
MR. LIVINGSTON.

Prerequisite, Botany 1; Botany 26 recommended.

82. (II) PLANT GEOGRAPHY.—A survey of descriptive and historical plant geography as well as the basic principles governing the natural distributions of plants. Included as topics are problems of dispersal and migration, endemism, species senescence, discontinuous distributions, polyphesis, continental drift, and geographical aspects of polyploidy. The

course is designed for advanced undergraduates or qualified graduate students.

2 class hours.

Credit, 2.
Mr. HODGE.

Prerequisite, Botany 81 or equivalent recommended.

85. (I) 86. (II) PROBLEMS IN BOTANY.—Supervised problem work for qualified students.

Hours by arrangement.

Credit, 1-3.
THE STAFF.

BUSINESS ADMINISTRATION

Professor GAMBLE, Professor HARDY, Professor KIMBALL, Associate Professor SIEVERS, Assistant Professor COLWELL, Assistant Professor DONALD, Assistant Professor DYMOND, Assistant Professor HOAR, Assistant Professor SMART, Mr. HUMMEL, Miss MATHIASSEN, Mr. RIVERS, Mr. SCHOEFFLER, Mr. SINGER.

Accounting.

25. (I) PRINCIPLES OF BUSINESS ACCOUNTING.—This course aims to give the student a working knowledge of the principles underlying the accounting system in the gathering, analysis, and interpretation of accounting data. The managerial uses of accounting as a means of business control are the keystone of the course.

1 class hour; 2 2-hour laboratory periods.

2:00-2:50 or 3:00-3:50 W.; 1:00-2:50 or 3:00-4:50 M. F.

Credit, 3.

Mr. COLWELL, Mr. SINGER.

26. (II) PRINCIPLES OF BUSINESS ACCOUNTING.—This course covers the problems of partnership and corporation accounting. Considerable time is spent on problems in amortization, depreciation, and the preparation, analysis and interpretation of financial statements.

1 class hour; 2 2-hour laboratory periods.

2:00-2:50 W.; 1:00-2:50 M. F.

Credit, 3.

Mr. COLWELL, Mr. SINGER.

71. (I) ADVANCED ACCOUNTING.—A fuller treatment of the accounting and financial problems of business units, including illustrative problems and case material.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. SMART.

Prerequisite, Accounting 26.

72. (II) ADVANCED ACCOUNTING.—A continuation of Accounting 71.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. SMART.

Prerequisite, Accounting 71.

73. (I) COST ACCOUNTING.—The application of accounting techniques to industrial costs.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. COLWELL, Mr. SCHOEFFLER, Mr. SINGER.

Prerequisite, Accounting 26.

74. (II) ACCOUNTING SYSTEMS.—The application of accounting principles to representative types of business and the study of Federal Income Tax and Social Security accounting problems.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Prerequisite, Accounting 73. Mr. COLWELL.

75. (I) ADMINISTRATIVE ACCOUNTING AND CONTROL.—The preparation and analysis of budgets, reports, and internal checks, using accounting techniques and data, as control devices in business and industry.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Prerequisites, Accounting 25 and 26. Mr. COLWELL.

76. (II) AUDITING.—A course in the interpretation of accounting records dealing with theory and procedure. C.P.A. and American Institute of Accountants examination problems are studied.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Prerequisite, Accounting 72 and 73. Mr. COLWELL.

Finance

53. (I) MONEY, BANKING AND CREDIT.—A critical survey of the development and operation of the monetary and banking systems of the United States.

3 class hours. Credit, 3.

Mr. GAMBLE, Mr. KIMBALL, AND THE DEPARTMENT.

65. (I) CORPORATION FINANCE.—An introductory course in business finance concerned with forms of ownership organization, the nature and uses of corporate securities, provision and maintenance of capital, financial expansion, and corporate reorganization.

3 class hours. Credit, 3.

Mr. KIMBALL, AND THE DEPARTMENT.

76. (II) INSURANCE.—A general course concerning certain risks to which individuals and business enterprises are exposed and the methods and institutions evolved to insure against loss arising from these hazards.

3 class hours. Credit, 3.

Mr. KIMBALL.

78. (II) PUBLIC FINANCE.—Principles of public revenues and expenditures with special emphasis on the systems and problems of taxation.

3 class hours. Credit, 3.

11:00-11:50 M. W. F.

Mr. GAMBLE.

81. (I) PROBLEMS IN BUSINESS FINANCE.—A study of problems of financial management of business corporations and the effects of financial policies on the individual firm and the economy as a whole.

3 class hours.

Credit, 3.

Mr. KIMBALL.

Prerequisite, Finance 65.

82. (II) INVESTMENTS.—The principles and techniques that are useful for the analysis and selection of investment media; investment policies of individuals and institutions.

3 class hours.

Credit, 3.

Mr. KIMBALL.

Prerequisite, Finance 65 or consent of instructor.

Business Law

70. (II) BUSINESS LAW.—This course consists of a study of the drawing, reading, and interpretation of contracts and sales, with specific problem work. In addition, wills, commercial paper, carriers, real estate agency, public and personal rights are studied.

3 class hours.

Credit, 3.

9:00-9:50 M. F.

Mr. SMART.

71. (I) LEGAL ASPECTS OF ECONOMIC TRANSACTIONS.—A continuation of Course 70.

3 class hours.

Credit, 3.

Mr. SMART.

Prerequisite, Business Law 70.

Industrial Administration

11. (I) ECONOMIC GEOGRAPHY.—A study of the geographic distribution of natural and human resources and the economic and physiographic bases of agriculture, manufacturing, and allied industries.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. HALLER, Mr. HOAR.

76. (II) PRINCIPLES OF TRANSPORTATION.—The development of highway, waterway, railway, and air transportation, and its relation to the agricultural and industrial development of the United States; the principles governing the operation and control of transportation agencies; present-day problems relating to the shipment of farm and industrial products, rates, facilities and services; methods of reducing wastes in transportation; freight management.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. HALLER, Mr. RIVERS.

83. (I) BUSINESS MANAGEMENT.—A study of the problems connected with the management of a business enterprise.

3 class hours.

Credit, 3.

Mr. DYMOND, Mr. HOAR.

84. PERSONNEL ADMINISTRATION.—A study of the principles of the management of labor relations.

3 class hours.

Credit, 3.
Mr. HOAR.

Marketing

52. (II) INDUSTRIAL PURCHASING.—A study of the purchasing problems of industrial enterprises and their market contacts with their sources of supply.

3 class hours.

Credit, 3.
Mr. HUMMEL.

53. (I) MARKETING AND MARKETING PROBLEMS.—Not open to students who have taken or are taking Agricultural Economics 55. A study of the forces and conditions which determine prices and the mechanism, methods, and problems concerned with transporting, storing and distributing economic goods.

3 class hours.

10:00-10:50 Tu. S.; 11:00-11:50 Th.

Credit, 3.
Mr. HARDY, Mr. HUMMEL.

54. (II) SALESMANSHIP AND SALES MANAGEMENT.—The principles and practices of selling and the management of selling enterprises.

3 class hours.

Credit, 3.
Mr. HARDY.

71. (I) RETAIL MERCHANDISING.—A study of the operation and productive functions of retail business.

3 class hours.

Credit, 3.
Mr. HUMMEL.

72. (II) MARKET RESEARCH.—The aims, sources and fact-gathering methods of market research activities. General study and individual research projects.

3 class hours.

Credit, 3.
Mr. HUMMEL.

73. (I) ADVERTISING.—A study of the techniques and media of advertising, its services to business and the organization and economic function of the advertising industry.

3 class hours.

Credit, 3.
Mr. HARDY.

74. (II) NEW ENGLAND MARKETS.—Individual and group study of the marketing problems of New England industrial and marketing enterprises.

3 class hours.

Credit, 3.
Mr. HARDY.

CHEMISTRY AND CHEMICAL ENGINEERING

CHEMISTRY

Professor RITCHIE, Professor FESSENDEN, Professor SMITH, Associate Professor CANNON, Associate Professor TURNER, Assistant Professor RICHASON, Assistant Professor ROBERTS, Assistant Professor STEIN, Dr. PARROTT*, Mr. CRUICKSHANK, Mr. OBERLANDER, Mr. POLCHLOPEK, Mr. PIERCE.

1. (I) 2. (II) GENERAL CHEMISTRY.—A study of the fundamental chemical laws and theories. A considerable amount of descriptive material will be included in connection with discussions of the periodic system, atomic structure, and in various applications of the principles. The object of the course is to give the student a sound scientific training through a course in chemistry. Students who have had no previous work in chemistry will be grouped together in laboratory and recitation sections so that they may have special attention.

2 class hours; 1 quiz hour; 1 2-hour laboratory period Credit, 3.
Mr. FESSENDEN, Mr. RICHASON, Mr. OBERLANDER.

4. (II) GENERAL INORGANIC CHEMISTRY.—For students planning to major in chemistry or chemical engineering, and others who plan to continue the study of this science in preparation for their field of specialization. The course will include ionic equilibria; oxidation and reduction; electrochemistry; the descriptive chemistry of some nonmetallic and metallic elements; the metallurgy of some common metals, and a discussion of the production of some of the more important inorganic chemicals. Applications of atomic structure and the electronic theory of valence to these subjects will be stressed.

2 class hours; 1 quiz hour; 2 2-hour laboratory periods. Credit, 4.
Mr. FESSENDEN, Mr. RICHASON.

Prerequisite, Chemistry 1.

29. (I) and (II) QUALITATIVE ANALYSIS.—A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. The laboratory work deals with the characteristic properties, reactions, and the systemic separation and identification of the common cations and anions. The semi-micro technique is used throughout for the analysis of salts, salt mixtures, and alloys. A considerable portion of the laboratory work is devoted to the identification of substances unknown to the student. This course is designed to meet the needs not only of those students specializing in chemistry, but also of those students specializing in other subjects where inorganic chemistry is of importance.

2 class hours; 6 laboratory hours. Credit, 4.
8:00-8:50 or 10:00-10:50 Tu. Th.; 8:00-9:50 or 10:00-11:50 M. W. F.
or 1:00-3:50 M. F. or 1:00-3:50 Tu. Th. Mr. SMITH.

Prerequisite, Chemistry 2.

30. (I) and (II) QUANTITATIVE ANALYSIS.—The theory and practice of representative determinations, both gravimetric and volumetric. The laboratory work will include the gravimetric analysis of chloride, sul-

* On leave of absence for military service

fate, and limestone, volumetric work with acids and bases, volumetric precipitation methods, and oxidation reduction titrations.

2 class hours; 2 3-hour laboratory periods. Credit, 4.
11:00-11:50 Tu. Th.; 1:00-3:50 M. F. or Tu. Th. or 1:00-3:50 W.;
9:00-11:50 S. Mr. ROBERTS.

Prerequisite, Chemistry 29.

31. (I) 32. (II) ORGANIC CHEMISTRY.—A short course intended to satisfy the requirements in this field for all students who do not specialize in chemistry.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th.; 2:00-3:50 Th. Mr. RITCHIE.
Prerequisites, Chemistry 1 and 2.

51. (I) 52. (II) ORGANIC CHEMISTRY.—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those who may specialize in other fields where a more comprehensive course is desired than Chemistry 31 and 32. The first semester deals largely with compounds of the aliphatic series, while the benzene series is taken up in the second semester. Students electing this course should take both 51 and 52.

3 class hours; 1 3-hour laboratory period. Credit, 4.
9:00-9:50 M. W. F.; 1:00-3:50 M. W. or F.
Mr. RITCHIE, Mr. CANNON.

Prerequisite, Chemistry 29.

63. (I) CHEMISTRY OF WATER, SEWAGE AND SEWAGE SLUDGE.—Admission by permission of the instructor. The preparation of reagents and standard methods for the analysis of water, sewage and sewage sludge. Lectures and discussions on the sanitary significance of analytical data.

2 3-hour laboratory periods. Credit, 3.
1:00-3:50 W.; 9:00-11:50 S. Mr. _____
Prerequisite, Chemistry 30.

65. (I) 66. (II) PHYSICAL CHEMISTRY.—A study of the fundamental theories and laws of physical chemistry, together with the solution of problems involved in their application. The laboratory work will include practice in making physico-chemical measurements and the preparation of reports.

3 class hours; 1 3-hour laboratory period. Credit, 4.
8:00-8:50 or 11:00-11:50 M. W. F.; 1:00-3:50 M. W. or F.
Mr. FESSENDEN, Mr. SMITH.

Prerequisites, Chemistry 30; Mathematics 30; Physics 26.

77. (I) ADVANCED PHYSICAL CHEMISTRY.—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry.

3 class hours. Credit, 3.
Mr. FESSENDEN.

Prerequisites, Chemistry 65 and 66.

79. (I) ELEMENTARY BIOCHEMISTRY.—A consideration of the more important facts relating to biological materials and processes. This course

is designed primarily for students not eligible for courses 93 or 94. It is not open to chemistry majors and is not offered for graduate credit.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. TURNER.

80. (II) CLINICAL CHEMISTRY (Blood and Urine Analysis).—Work to be covered will include the collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of certain significant compounds in the samples. The latter group will include at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. TURNER.

81. (I) ORGANIC CHEMISTRY.—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects. Admission by permission of instructor.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. CANNON.

82. (II) QUALITATIVE ORGANIC CHEMISTRY.—The characterization of organic compounds by means of physical properties, class reactions, and the preparation of suitable derivatives. The laboratory work will involve the identification of a number of simple unknown compounds followed by the separation, purification, and identification of the individual components in several unknown mixtures of organic compounds. Admission by permission of instructor.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 2:00-4:50 Tu. Th.

Mr. CANNON.

83. (I) ADVANCED QUANTITATIVE ANALYSIS.—Designed primarily for chemistry majors, but open to others with permission of the instructor. The laboratory work will include representative determinations in electrolytic and electrometric methods; and an introduction to colorimetry and other optical methods of analysis. Selected topics in the use of organic precipitants, silicate analysis, analysis of steel and other alloys, fuels, oils, water, and gases will also be included.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROBERTS.

Prerequisite, Chemistry 30.

86. (II) THEORETICAL INORGANIC CHEMISTRY.—A survey of inorganic chemistry which is largely theoretical and includes such topics as atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. SMITH.

Prerequisite, Chemistry 65.

88. (II) HISTORY OF CHEMISTRY.—An historical and biographical study of chemistry and chemists. The aim of the course is: (1) to give

the student a comprehensive view of the science as a whole, through a study of the development of new ideas and the establishment of new theories and laws; and (2) to arouse an enthusiastic interest in the subject and an appreciation of the true spirit of scientific research, through a sympathetic presentation of the work and lives of the great chemists who have been the creators of the chemistry of today.

3 class hours.

Credit, 3.
Mr. RITCHIE.

10:00-10:50 M. W. F.

92. (II) INTRODUCTION RESEARCH.—Admission only by permission of the department. The aim of the course is to give the student an opportunity to learn the purpose and methods of research. To each student is assigned some special subject or problem in one of the following fields of chemistry, viz., analytical, biochemical, inorganic, organic, physical.

10 laboratory hours.

Hours by arrangement.

Credit, 5.
THE DEPARTMENT.

93. (I) 94. (II) GENERAL BIOCHEMISTRY.—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences, and provide a background for more advanced or specialized study in this field.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.
Mr. TURNER.

Prerequisites, Chemistry 51 and 52 or their equivalent.

CHEMICAL ENGINEERING

Professor LINDSEY, Assistant Professor CASHIN, Mr. CHAKOUR.

55. (I) CALCULATIONS.—A problem course covering advanced stoichiometry, material balances, gas laws, vapor pressure, humidity, and fluid flow. Problems are of the industrial type.

3 class hours.

Credit, 3.
Mr. CASHIN.

Prerequisites, Chemistry 29, 30; Mathematics 31, 32; Physics 25, 26.

56. (II) UNIT OPERATIONS I.—A study of the fundamental principles underlying the unit operations of heat transfer, evaporation-diffusion processes, humidity, air conditioning, drying, and distillation. Solution of problems on the basis of actual operating data and descriptions of industrial process equipment are emphasized.

3 class hours.

Credit, 3.
Mr. CASHIN.

Prerequisites, Chemistry 65; Chemical Engineering 55.

57. (I) INORGANIC (INDUSTRIAL) TECHNOLOGY.—A study of the manufacture of some of the important inorganic chemicals. Topics studied include sulfuric acid, nitric acid, hydrochloric acid, ammonia, sodium carbonate, and sodium hydroxide with particular stress on the unit operations. Field trips will be included where possible.

3 class hours.

Credit, 3.
Mr. CHAKOUR.

Prerequisites, Chemistry 30; Physics 26.

58. (II) ORGANIC (INDUSTRIAL) TECHNOLOGY.—A study of some of the unit processes involved in the manufacture of organic materials. Unit processes studied include nitration, amination, halogenation, oxidation, and esterification. Field trips will be included where possible.

3 class hours.

Credit, 3.

Mr. CHAKOUR.

Prerequisite, Chemistry 51.

60. (II) HEAT-ENERGY RELATIONS.—A study of the laws of energy as applied to chemical engineering. A problem course covering internal energy, enthalpy, entropy, and free energy of matter. Applications to compression, refrigeration, real gases, and chemical equilibrium are studied.

3 class hours.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemistry 65; Chemical Engineering 55.

75. (I) INSTRUMENTATION.—A detailed study of the underlying principles and practices of indicating, recording, and controlling instruments actually used on industrial chemical process equipment.

3 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisites, Physics 25, 26; Chemical Engineering 56.

76. (II) ABSTRACTS.—Individual reports, both oral and written, on subjects of interest taken from current chemical and chemical engineering literature.

2 class hours.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Chemical Engineering 93.

89. (I) CHEMICAL ENGINEERING LABORATORY I.—A quantitative study of pilot plant sized chemical engineering equipment, illustrating the unit operations of fluid flow, heat transfer, distillation, etc. Special emphasis is placed on the securing of reliable data, correct operating techniques, and the importance of industrial report writing.

1 3-hour period.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Chemical Engineering 56.

90. (II) CHEMICAL ENGINEERING LABORATORY.—A continuation of Course 89, including the study of continuous rectification, gas absorption, heat transfer, drying and filtration.

2 4-hour laboratory periods.

Credit, 4.

THE DEPARTMENT.

Prerequisites, Chemical Engineering 89, 93.

93. (I) COMPREHENSIVE PROBLEMS (PROJECTS).—The solution of comprehensive problems which involve the application and integration of a number of the principles studied in previous courses in chemistry and chemical engineering. Particular emphasis is placed on the presentation of the results as formal reports.

2 class hours; 1 3-hour period.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 56, 60.

94. (II) COMPREHENSIVE PROBLEMS (PROJECTS) II.—The solution of problems similar to those in Course 93 will be undertaken, but in addition, will involve the application of principles studied in Course 97.

2 class hours; 2 3-hour periods.

Credit, 4.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 93, 97.

97. (I) UNIT OPERATIONS II.—A continuation of Course 56, including the additional unit operations of gas absorption, absorption, solvent extraction, crystallization, filtration, mixing, crushing and grinding, mechanical separation, and high pressure technique.

3 class hours.

Credit, 3.

Mr. CHAKOUR.

Prerequisite, Chemical Engineering 56.

98. (II) ADVANCED UNIT OPERATIONS.—A continuation of Course 97 with particular reference to diffusion processes and multi-component distillation.

2 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisite, Chemical Engineering 97.

DAIRY INDUSTRY

Professor HANKINSON, Assistant Professor LINDQUIST,
Assistant Professor NELSON, Mr. FINNEGAN.

25. (I) GENERAL DAIRYING.—This course is introductory to all other courses in dairy industry and gives a general knowledge of the subject to those who wish to take only one course in dairying. The lecture portion includes the importance of the dairy industry, the composition and properties of milk, the secretion of milk, production of quality milk on the farm, methods of processing milk and cream, and the elements of ice cream, butter and cheese making. The laboratory work includes the testing of milk and milk products for fat and acidity, lactometry, and a general study of dairy plant equipment and processes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu. Th.; 9:00-10:50 W. or 2:00-3:50 Tu.

Mr. HANKINSON, Mr. FINNEGAN.

50. (II) JUDGING DAIRY PRODUCTS.—A study of market standards and grades of dairy products, with practice in judging milk, ice cream, butter, and cheese. The student learns to recognize quality in dairy products, to detect specific defects, and to know their causes and means of prevention. A team is chosen from this class to represent the University in two contests: Eastern States Intercollegiate Dairy Products Judging Contest, and Collegiate Students' International Contest in Judging Dairy Products.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 F.

Mr. NELSON.

52. (II) MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value, and advertising. Cultured milk and other milk drinks also are included. Some milk plants are visited, the cost of the trip not exceeding five dollars.

2 class hours; 2 2-hour laboratory periods.

Credit, 4.

8:00-8:50 Tu. Th.; 9:00-10:50 Tu. Th. or 3:00-4:50 Tu. Th.

Mr. LINDQUIST.

75. (I) DAIRY CHEMISTRY.—This course is a particular study of those physical and chemical principles which not only explain the behavior of milk and milk products in the various technological operations, but also provide a basic viewpoint for dairy research. The lectures will include discussions (1) of the constituents of milk in relation to other organic compounds, and (2) the physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc. The laboratory work will include many of the tests used commercially and in dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-10:50 Tu.; 8:00-9:50 Th.

Mr. NELSON.

Prerequisites, Dairy 25, Dairy 52, and Chemistry 52, or permission of the instructor.

77. (I) BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of starter cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein is also covered.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 M. F.

Mr. LINDQUIST, Mr. NELSON, Mr. FINNEGAN.

Prerequisite, Dairy 25.

78. (II) ICE CREAM MAKING.—The course includes a study of the principles and practices of ice-cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished product are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 Tu. Th.

Mr. NELSON.

79. (I) 80. (II) SEMINAR.—For students specializing in dairy industry.

1 class hour.

Credit, 1.

11:00-11:50 M.

THE DEPARTMENT.

ECONOMICS

Professor GAMBLE, Associate Professor MORRIS, Assistant Professor HALLER,

Mr. MURPHY.

12. (II) ECONOMIC HISTORY OF THE UNITED STATES.—A study of the significant factors in the economic development of the nation.

3 class hours.

Credit, 3.

Mr. HALLER.

25. (I) and (II) ELEMENTS OF ECONOMICS.—Definitions and introductory principles of production, exchange, and the financial organization of society, with a short survey of the economics of distribution and the use of wealth and income.

3 class hours.

Credit, 3.

THE DEPARTMENT.

26. (II) ELEMENTS OF DISTRIBUTION.—A continuation of Course 25 with emphasis on the study of wealth and income distribution.

3 class hours.

Credit, 3.

Prerequisite, Economics 25.

THE DEPARTMENT.

51. (I) ECONOMICS OF BUSINESS AND INDUSTRY.—A study of the industrial relationships and the principles upon which the production of economic goods is based, with particular emphasis upon administrative controls of cost, quality, quantity, standards, personnel and purchasing.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. COLWELL.

55. (I) ECONOMICS OF CONSUMPTION.—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes.

3 class hours.

Credit, 3.

Mr. HALLER.

56. (II) BUSINESS CYCLES.—A study of business fluctuations and an analysis of current business cycle theories.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. DONALD.

70. (II) MONOPOLIES.—A study of the growth, development, and social control of monopolies.

3 class hours.

Credit, 3.

Mr. HALLER.

73. (I) MODERN ECONOMIC THEORY.—A study of current theories about value, distribution and prices.

3 class hours.

Credit, 3.

Mr. MORRIS, Mr. MURPHY, Mr. SCHOEFFLER, Mr. SIEVERS.

74. (II) CURRENT ECONOMIC PROBLEMS.—An advanced course for those desirous of studying more intensively some current economic

problems. Students will be encouraged to pursue lines of individual interest.

3 class hours.

Credit, 3.

THE DEPARTMENT.

77. (I) ECONOMICS OF INTERNATIONAL TRADE (1951-52). A study of the policies, principles, and practices of international trade. Given in alternate years.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. DONALD.

79. (I) LABOR PROBLEMS.—An analysis of the background and character of the modern labor problem with special references to the United States. Topics to be considered include: the problems of wages, hours, working conditions and unemployment; the trade union movement; and some agencies for the promotion of industrial peace.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. DONALD, Mr. DYMOND, Miss MATHIASSEN, Mr. MORRIS, Mr. RIVERS.

80. (II) LABOR LEGISLATION.—A study of federal and state legislation affecting labor.

3 class hours.

Credit, 3.

Miss MATHIASSEN, Mr. MORRIS.

83. (I) SOCIAL CONTROL OF BUSINESS.—Methods of social control of economic activity including both formal and informal controls.

3 class hours.

Credit, 3.

Mr. ———.

84. (II) COMPARATIVE ECONOMIC SYSTEMS.—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economies.

3 class hours.

Credit, 3.

Mr. ———.

91. (I) 92. (II) SEMINAR.—Research in economic theory; problems of labor, commerce, and industry. If desirable, some other economic study may be substituted.

1 or 2 2-hour conferences.

Credit, 1 to 3.

THE DEPARTMENT.

EDUCATION

Professor PURVIS, Assistant Professor OLIVER, Assistant Professor ROURKE,

Assistant Professor MCCARTHY, Assistant Professor WYMAN,

Mr. TAFT¹, Mr. DAYTON.

51. (I) HISTORY OF EDUCATION.—Educational movements are traced from early Greece to the present with the aim of better under-

¹ State Supervisor for Agricultural Teacher-Training representing the State Department of Education in the administration of vocational agricultural acts.

standing of modern education. This is normally the beginning course for students undertaking work in Education.

3 class hours.

Credit, 3.
Mr. PURVIS.

52. (II) PRINCIPLES AND METHODS OF TEACHING.—By means of discussion, case studies, and current educational literature, teaching ideals and procedures are set up. Application of the general principles are made in the major fields represented by the class.

3 class hours.

Credit, 3.
Mr. MCCARTHY.

53. (I) EDUCATIONAL TESTS AND MEASUREMENTS.—The most serviceable tests and scales for measuring achievement are considered; test construction, administration, scoring, and interpretation of results are studied and practiced. Considerable attention is given to preparation of informal tests for diagnostic and grading purposes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. ROURKE.

61. (I) METHODS IN ADULT EDUCATION.—Admission only by permission of instructor. The beginning Education course for juniors and seniors who are training for extension work and for others interested in teaching adults. Generally accepted methods of group and individual instruction with adults, and methods of developing leaders to carry on the work in the field.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. _____.

66. (II) PREPARATION AND USE OF AUDIO-VISUAL AIDS.—Study is made of available media of audio-visual aids to instruction, construction of visual material, and accepted methods of use.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. WYMAN.

72. (II) VOCATIONAL EDUCATION IN AGRICULTURE.—The course demands certain prerequisites of experience and a definite objective on the part of the student to enter the field of vocational agricultural teaching which makes it necessary for the student to seek permission to enter the course. It is the first of the series of special courses (72, 73, 75) required of candidates for the vocational teacher-training certificate. A survey of vocational education and an introduction to teaching of vocational agriculture at the secondary school level is the basis of the course. Certain information and observations in preparation for the apprenticeship course are offered.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

73. (I) and (II) APPRENTICE TEACHING IN AGRICULTURE.—For a limited number of qualified candidates in vocational education. A full year in absentia normally following the junior year in college, teaching agriculture, horticulture, and related subjects. Candidates should have completed the course in Education 72, and in Education 52, if possible, and must apply early to the instructor of the course.

Maximum credit, 6.

MR. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

75. (I) TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE.—By arrangement with the instructor. Preferably this course should follow Courses 72 and 73. It covers the materials, methods, policies, and special requirements of Massachusetts for teaching agriculture and related subjects in high schools and special country schools. This is one of three courses required of candidates for the agricultural teacher-training certificates.

3 class hours.

Credit, 3.

MR. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

83. (I) SECONDARY EDUCATION IN AMERICA.—This course presents a picture of the secondary school as a social agency, its relation to elementary and collegiate education, its aims, organizations, administration, curriculum procedures, and such other phases as are necessary to acquaint the student with the predominant level of our educational ladder.

3 class hours.

Credit, 3.

MR. MCCARTHY.

85. (I) and (II) OBSERVATION AND PRACTICE TEACHING.—Admission by permission of the Department. An opportunity to do regular teaching in cooperating high schools within commuting distance of the University. The student works under the supervision of a teacher with frequent visits from some member of the staff.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Education 51, 52, 83 or their equivalent.

88. (II) THE SCHOOL CURRICULUM.—This course discusses the curriculum of schools of this country from the point of view of the general social philosophy which created it. It seeks to make clear to the student the various controversial issues regarding such concepts as progressive education, the core-curriculum, the experience curriculum, projects, etc. An outline course of study is prepared by each student in the field he is to teach.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

MR. ROURKE.

90. (I) and (II) EVALUATION OF LEARNING.—For senior majors in Education. Tests and scales for measuring ability and achievement; standard tests and interpretation of results; construction of informal tests for diagnostic and grading purposes.

3 2-hour periods the first and each alternate week.

Credit, 3.

MR. ROURKE.

91. (I) and (II) SECONDARY SCHOOL CURRICULUM.—For senior majors in Education. A consideration of learning material and activities and their organization in the subjects which these students are teaching, and the preparation of courses of study in those fields in the light of accepted educational practice.

3 2-hour periods the first and each alternate week.

Credit, 3.

Mr. ROURKE.

Prerequisite, Education 51.

92. (I) and (II) METHODS AND MANAGEMENT.—For senior majors in Education. The basic methods underlying teaching and class management will be discussed and illustrated. The work in this course will be correlated as closely as possible with the observation and practice of the students in neighboring schools.

3 2-hour periods the first and each alternate week.

Credit, 3.

Mr. PURVIS.

Prerequisite, Education 51.

93. (I) and (II) PRINCIPLES OF SECONDARY EDUCATION.—For senior majors in Education. Practical problems concerning the school as a social agency, its aims, characteristics of pupil population, program of study, guidance, extra curriculum, etc., from the point of view of situations met by teachers.

3 2-hour periods the first and each alternate week.

Credit, 3.

Mr. MCCARTHY.

Prerequisite, Education 51.

94. (I) and (II) PRACTICE TEACHING.—For senior majors in Education. Five school days of observation and teaching each alternate week in neighboring secondary schools under supervision of competent teachers and members of the staff.

The second and each alternate week.

Credit, 5.

THE DEPARTMENT.

Prerequisite, Education 51.

AGRICULTURAL ENGINEERING

Professor STAPLETON, Associate Professor MARKUSON, Assistant Professor TAGUE, Assistant Professor PUSHEE, Assistant Professor PFLUG,
Mr. PATTERSON.

51. (I) HOUSE PLANNING.—Plan designs of the small house will be made. The arrangement of interior equipment, especially in the kitchen, and lighting, heating, water supply, and sewage disposal will be studied, together with a brief history of the house materials, construction methods, equipment, and architectural styles. Consideration will be given to the economics of house building, including financing and to maintenance and overhead expense.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. MARKUSON.

55. (I) FARM SHOP.—For students in agriculture and horticulture. Laboratory exercises cover instruction and practice in the use of carpenter's tools in construction and in bench work, arc and gas welding, pipe fitting, soldering, use of machinist's tools in machinery repair, and the mixing and placing of concrete. Classroom instruction covers materials of construction and the utilization of local and special materials for these purposes.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. PUSHEE.

71. (I) FARM POWER.—The study of internal combustion engines used in farm tractors and power units.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. PFLUG.

Prerequisites, Civil Engineering 52, Mechanical Engineering 65, 68.

72. (II) DRAINAGE AND IRRIGATION ENGINEERING.—This course is an abridgment of Agricultural Engineering 78 for students not majoring in Engineering who do not have the prerequisites for Course 78.

1 class hour; 1 2-hour laboratory period.

Credit, 2.
Mr. PFLUG.

73. (I) FARM STRUCTURES.—A study of the strength and durability of building materials, construction systems and the mechanical principles underlying their use in farm-construction. In the drafting room studies will be made of some major farm building and complete working drawings finished in all essential details.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.
Mr. MARKUSON.

Prerequisites, Civil Engineering 34, 51; Mechanical Engineering 61.

74. (II) FARM STRUCTURES.—This course is an abridgment of Agricultural Engineering 73 for students not majoring in Engineering who do not have the prerequisites for Course 73.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. STAPLETON.

76. (II) AGRICULTURAL MACHINERY.—The study of design and operational problems of agricultural field machinery.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. STAPLETON.

Prerequisites, Civil Engineering 52, Mechanical Engineering 68, 83.

78. (II) DRAINAGE, RECLAMATION AND CONSERVATION.—The course covers the engineering phase of drainage and reclamation. The various systems are studied, complete layouts established in the field, and problems of flow and run-off given.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. PFLUG.

Prerequisites, Civil Engineering 25, 75 or 76; Agronomy 2.

80. (II) FOOD PROCESS ENGINEERING.—A study of food processing machinery and instrumentation.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. PFLUG.

83. (I) 84. (II) AGRICULTURAL ENGINEERING PROBLEMS.—Open only to seniors specializing in agricultural engineering. This course consists of individual problems chosen by the students under guidance of the department.

Hours by arrangement.

Credit, 3.
THE DEPARTMENT.

85. (I) RURAL ELECTRIFICATION.—A course devoted to the utilization of electricity in agriculture.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. STAPLETON.

Prerequisites, Electrical Engineering 61, 62.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in agricultural engineering.

1 class hour.

Credit, 1.
THE DEPARTMENT.

CIVIL ENGINEERING

Professor MARSTON, Professor WHITE, Associate Professor OSGOOD, Associate Professor HENDRIKSON, Assistant Professor ANDERSON, Mr. COFFEY†, Mr. MARCUS, Mr. GROW, Mr. CARVER, Mr. GABRYS.

25. (I) SURVEYING.—The theory of surveying for both measurement and layout work, description of field and office methods of computations, notes, and drafting procedure are given in the classroom. Topics covered are use of tape, transit, level, and plane table; methods of carrying out property surveys, layout surveys, computation and field work for simple and compound horizontal and vertical curves, determination of geographic position, determination of azimuth from the Sun and Polaris, and a finished map of a small area.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.
Mr. HENDRIKSON.

Prerequisite, Mathematics 5.

27. (I) and (II) PLANE SURVEYING.—The basic principles of mensuration are discussed in class. Instruction and problems involving the use of tape, transit and level are given in the field, and the preparation of a map of a small area is carried out in the drafting room. Route surveying is considered briefly. This course is not open to civil engineering students.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. ANDERSON.

Prerequisite, Mathematics 5 or 7.

† On leave of absence.

28. (Summer) PROPERTY AND TOPOGRAPHIC SURVEYING.—This course consists of a transit and tape property survey in which reference to Registry of Deeds records is required, and topographic survey of a selected area using the plane table. Certain advanced topics such as triangulation and conformal coordinate systems are discussed as they relate to the topographic survey.

3 44-hour weeks.

Credit, 3.

Mr. HENDRICKSON, Mr. ANDERSON.

Prerequisite, Civil Engineering 25 or 27.

30. (Summer) ROUTE SURVEYING PRACTICE.—This practice course consists of a preliminary survey for a short highway location and of the preparation of maps and profile from the data recorded on the survey. The maps are to be used in C.E. 55 in choosing the final location of the route and in estimating earthwork quantities and cost.

3 44-hour weeks.

Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 25 or 27.

34. (II) APPLIED MECHANICS (STATICS).—The following topics are considered: equilibrium of forces, friction, first and second moments, center of gravity. Algebraic and graphical methods are covered.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Physics 25; Mathematics 31.

51. (I) STRENGTH OF MATERIALS.—The following topics are considered: simple stresses and strains; combined stresses; torsion; shear and bending moments in beams; stresses and deflections of beams; columns.

4 class hours.

Credit, 4.

Mr. WHITE, Mr. MARCUS, Mr. SOBALA.

Prerequisites, Civil Engineering 34; Mathematics 32.

52. (I) and (II) APPLIED MECHANICS (KINETICS).—The following topics are considered: kinematics, motion of particles, motion of rigid bodies, work and energy, power, impulse and momentum.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

53. (I) STRENGTH OF MATERIALS.—A shortened version of C.E. 51 for electrical and mechanical engineers in the industrial option.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. COFFEY, Mr. MARCUS.

Prerequisites, Civil Engineering 34; Mathematics 32.

55. (I) HIGHWAY ENGINEERING.—The design features of highway construction and relative merits of various types of highway surfaces are discussed in class. Plans, profiles, cross sections, and specifications for a short section of highway are prepared.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. GABRYS.

61. (I) and (II) TESTING OF MATERIALS.—A study of laboratory methods for determining the physical properties of engineering materials and their behavior under load.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. WHITE, Mr. COFFEY.

Prerequisite, Civil Engineering 51 or 53.

70. (II) THEORY OF STRUCTURES.—This course treats with the analysis of statically determinate structures of wood and steel, with reference to particular structures, such as industrial and office buildings, highway and railway bridges. The use of influence lines in the study of movable loads is included.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 51.

71. (I) STRUCTURAL DESIGN.—This course is an application of the theory of structures to engineering practice through the preparation of designs and drawings for structural frames, girders and trusses in steel and wood that together make up a complete building frame or bridge. Emphasis is placed upon the design of structural members and joints.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 70.

72. (II) ADVANCED STRUCTURAL THEORY.—The analysis of space frames and methods of finding deflections of trusses and beams are studied. Several methods of analysis of statically indeterminate structures are introduced. Application of the theories considered is made in the solution of practical problems during the laboratory periods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 70.

73. (I) CONCRETE.—This course deals with the general methods of analyzing plain and reinforced concrete structures. Application is made to the design of slabs, beams, girders, columns, walls and foundations for buildings, retaining walls and bridges. Drawings are prepared for a reinforced concrete building.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Mr. OSGOOD, Mr. GABRYS.

Prerequisite, Civil Engineering 51.

75. (I) FLUID MECHANICS.—This course is an abridgment of Civil Engineering 76.

3 class hours.

Credit, 3.

Mr. MARSTON, Mr. CARVER.

Prerequisite, Civil Engineering 52.

76. (I) and (II) FLUID MECHANICS.—The following topics are considered: properties of fluids, gas laws, viscosity, static pressure, gages, buoyant forces, dynamics of fluids, Bernoulli's theorem, flow in pipes,

orifices, nozzles, weirs, and open channels. Hydraulic similitude and dimensional analysis are discussed.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. CARVER.

Prerequisite, Civil Engineering 52.

77. (I) SANITARY ENGINEERING I.—This course considers the engineering aspects of public water supply systems and includes the following topics: quantity of water required; hydrology; collection systems; distribution systems; pumping machinery; purification work. The laboratory period is used for inspection trips and the treatment of special problems.

3 class hours.

Credit, 3.
Mr. ANDERSON.

Prerequisite, Civil Engineering 76 or 75 concurrently.

78. (II) SANITARY ENGINEERING II (SEWAGE).—This course considers the engineering aspects of the design, construction, and maintenance of sewerage systems and includes the following topics: hydraulics of sewers, sanitary and storm sewers, sewage treatment, plant design and operation.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Prerequisite, Civil Engineering 77.

Mr. ANDERSON.

79.—(I) PRINCIPLES OF SANITARY ENGINEERING.—This course is designed to fill the needs of students in the Department of Public Health. It covers phases of Civil Engineering 77 and 78 with consideration of the non-engineering background of the student. Admission by permission of the instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. ANDERSON.

80. (II) SOIL MECHANICS.—This course is a study of the mechanical classification of soil based upon field and laboratory work and the validity of these classifications as a means of predicting soil behavior. The student is guided through case studies in embankment stability, seepage and consolidation.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. HENDRICKSON.

Prerequisite, Geology 50.

81. (I) FOUNDATIONS.—A survey of modern theories and practice in transferring structural loads to earth masses. Pile foundations, spread footings, caissons, and buoyant systems are discussed.

2 class hours, 1 3-hour laboratory period.

Credit, 3.
Mr. HENDRICKSON.

Prerequisite, Civil Engineering 80.

84. (II) TRANSPORTATION ENGINEERING.—This course treats the planning and design of freight and passenger terminals. Case histories

are studied to show the peculiar problems of each of the four main kinds of transport; rail, highway, water, and air.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 55.

86. (II) SANITARY ENGINEERING DESIGN.—This is a laboratory course devoted to the design of sanitary engineering facilities, water supply and treatment, sewerage and sewage treatment.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

Mr. ANDERSON.

Prerequisites, Civil Engineering 77 and 78, or concurrently.

88. (II) ADVANCED STRESS ANALYSIS.—This course is concerned with the determination of stresses and strains in structural and machine elements.

3 class hours.

Credit, 3.

Mr. WHITE.

Prerequisite, Civil Engineering 51.

90. (II) CONTRACTS, SPECIFICATIONS AND ESTIMATING.—A study of the essentials of contracts as applied to business procedures in the construction field, the purposes and make-up of specifications, and the processes of estimating through quantity, surveys and unit cost applications.

3 class hours.

Credit, 3.

Mr. MARKUSON.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in civil engineering. Current engineering projects are described by student reports. The professional aspect of the civil engineer's work is stressed.

1 class hour.

Credit, 1.

THE DEPARTMENT.

94. (II) ADVANCED SURVEYING.—The following topics are included: elements of astronomy, precise methods of surveying, adjustment of observations and the elements of photogrammetry.

2 class hours. 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisites, Civil Engineering 25, 28.

96. (II) HYDRAULIC ENGINEERING.—The analysis and design of hydraulic structures such as storage reservoirs, spillways, dams, levees, and shore protection and channel works are considered.

2 class hours. 1 3-hour laboratory period.

Credit, 3.

Mr. MARSTON.

Prerequisites, Civil Engineering 71, 73, 76.

ELECTRICAL ENGINEERING

Professor BROWN, Professor ROYS, Associate Professor WILSON,
Associate Professor LANGFORD, Assistant Professor MOHN,
Assistant Professor SMITH, Assistant Professor CHANG,
Mr. SACHSE, Mr. JATRAS,†, Mr. LEVINE,
Mr. MARSH.

40. (II) FUNDAMENTALS OF ELECTRICAL ENGINEERING.—This course is a study of direct-current circuits, magnetism and electromagnetism, magnetic fields in air and iron, induced and generated voltages, inductance, capacitance, electric fields, conduction in liquids, and basic electrical measurements. The laboratory is devoted largely to electrical measurements, including instrument calibration and standardization, electrical instruments, fluxmeters, permeameters, simple bridges and potentiometers, and stresses analysis of methods and accuracies.

3 class hours; 1 3-hour laboratory period.

Credit, 4
Mr. JATRAS.

Prerequisites, Physics 26; Mathematics 31.

51. (I) ALTERNATING-CURRENT CIRCUITS.—This course is a study of alternating currents in power and communication circuits, and includes instantaneous voltage and current relationships, vector representation, resonance, phenomena, basic network theorems, coupled circuits, single phase and polyphase circuits, power and power measurements, non-sinusoidal waves.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. JATRAS.

Prerequisite, Electrical Engineering 40.

53. (I) DIRECT-CURRENT MACHINERY.—This course is a study of direct-current generators and motors with respect to their characteristics, design, operation, applications, and control.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. SACHSE.

Prerequisite, Electrical Engineering 40.

54. (II) ALTERNATING-CURRENT MACHINERY.—This course is a study of alternating-current generators, motors, transformers, and converters with respect to their design, operation, control and applications.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisites, Electrical Engineering 51, 53.

57. (I) ENGINEERING ANALYSIS.—This course is a study of differential equations as applied to electric systems, hyperbolic, Bessel, and Legendre functions, vector analysis and calculus with applications to electricity and magnetism, elliptic integrals, and solutions of field problems by conformal mapping.

3 class hours.

Credit, 3.
Mr. MOHN.

Prerequisites, Mathematics 32; Electrical Engineering 40.

† On leave of absence.

61. (I) 62. (II) PRINCIPLES OF ELECTRICAL ENGINEERING.—This course is designed for mechanical, industrial, and agricultural engineering students, and is a study of d-c and a-c circuits, d-c and a-c machines, and basic electronics.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LEVINE, Mr. MARSH.

Prerequisites, Physics 26; Mathematics 32.

63. (I) ELEMENTS OF ELECTRICAL ENGINEERING.—This course is for civil and chemical engineering students and is a brief study of d-c and a-c circuits and machines.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH.

Prerequisites, Physics 26; Mathematics 32.

65. (I) INDUSTRIAL APPLICATIONS.—This course is designed for mechanical and industrial engineering students and is a brief study of motor selection and control, protective devices, and electric and electronic applications in industry, including measurement and control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH.

Prerequisite, Electrical Engineering 62.

74. (II) ELECTRONICS.—This course includes the study of electron motion in electric and magnetic fields, electron tubes and their characteristics, rectifiers, and Class A amplifiers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. MOHN.

Prerequisite, Electrical Engineering 51.

75. (I) APPLIED ELECTRONICS.—This is a continuation of Course 74 and includes a study of electron tubes and associated apparatus in amplifiers, oscillators, amplitude and frequency modulation, detection, multi-vibrators, and vacuum tube instruments.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LANGFORD.

Prerequisite, Electrical Engineering 74.

77. (I) ELECTRICAL NETWORK ANALYSIS.—This course is a review of fundamental circuit principles and theorems, Fourier Series and Integral and their applications to distorted waves and pulses, long lines and filters under steady state a-c conditions and traveling waves in transmission systems.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisite, Electrical Engineering 51.

78. (II) TRANSIENT ANALYSIS.—This course is a study of the transient behavior of electrical, mechanical and thermal systems, and includes the formulation of the ordinary and partial differential equations

of dynamic systems and their solution by the classical and Heaviside methods and by Fourier and Laplace transforms.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 51, 57.

79. (I) ELECTRICAL COMMUNICATIONS.—This course is a study of the fundamentals of communication circuits, including circuit elements, basic network theorems, impedance transformations, equalizers, and bridge circuits.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisite, Electrical Engineering 51.

80. (II) ELECTRICAL COMMUNICATIONS.—This is a continuation of Course 75 and includes a study of vacuum tube circuits used in communications, distortion, noise, class B and C power amplifiers, modulation and demodulation practice, oscillator design, transmitters and receivers, antennas and radiation, and electromechanical transducers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisites, Electrical Engineering 75, 79.

81. (I) ADVANCED ELECTRICAL MACHINERY.—This is a continuation of Course 54 and is a more advanced study of machines, including the general methods of machine analysis through the use of matrices, symmetrical components, equivalent circuits, and circle diagrams. Emphasis is placed on single-phase and variable-speed a-c motors, converters and inverters, selsyns and amplidyne, and multiwinding transformers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisite, Electrical Engineering 54.

82. (II) POWER APPLICATIONS IN INDUSTRY.—This course is a study of industrial applications of electrical machines, and includes power supplies to industrial plants, load requirements, types of drives, mechanical requirements of variable speed drives, torque relations in d-c and a-c motors, motor applications and control, and selsyn systems.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisite, Electrical Engineering 81.

84. (II) INDUSTRIAL ELECTRONICS.—This course is a study of special characteristics of the electron tubes of industry, the theory, design and operation of commercial types of circuits utilizing these tubes, including stroboscope, grid-controlled and polyphase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, and others.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. ROYS.

Prerequisite, Electrical Engineering 74.

86. (II) POWER SYSTEM NETWORKS.—This course is a study of power system networks including power transfer diagrams, voltage studies, system stability criteria, short-circuit calculations, and protective methods.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisites, Electrical Engineering 77, 81.

88. (II) COMMUNICATION NETWORKS.—This is a continuation of Course 77, consisting of Foster's Reactance Theorem, the matrices of transducers and the principles of network synthesis. Applications include the analysis and design of filters, equalizers and other frequency responsive networks under both steady state and transient conditions.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 77, 79.

90. (II) ILLUMINATION.—This course is an introduction to illumination engineering and includes a study of light sources, units, measurements, vision, and lighting calculation and design.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisites, Physics 26; Mathematics 32.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in electrical engineering. Current engineering developments are discussed through student reports. The professional aspects of the electrical engineer's work is stressed. Instruction is given in the preparation of engineering papers for publication and in their presentation before technical audiences.

1 class hour.

Credit, 1.
Mr. BROWN.

94. (II) ULTRA-HIGH-FREQUENCY TECHNIQUES.—This course is a study of u.h.f. oscillators, amplifiers, transmitters, receivers, transmission systems, antennas, multi-vibrators, trigger and gate circuits, electronic switches, and controls.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisites, Electrical Engineering 75, 79.

96. (I) ELECTROMAGNETIC ENGINEERING.—This course is a study of the fundamentals of electromagnetic radiation, including Ampere's and Faraday's laws, Gauss's theorem, retarded potential and Hertz' vector, Maxwell's equations, and the Poynting vector. These are applied to wave propagation, reflection and refraction, lines, wave guides and cavity resonators, antennas, and ionosphere reflections.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 57, 77.

MECHANICAL ENGINEERING

Professor BATES, Professor SWENSON, Professor WEAVER, Associate Professor WOLOWICZ, Associate Professor KEYSER, Assistant Professor DITTFACH, Assistant Professor LONGSTAFF, Assistant Professor EMERSON, Assistant Professor LAKE, Assistant Professor ATHERTON, Mr. CARD, Mr. SOBALA.

1. (I) ENGINEERING DRAWING I.—The purpose of the course is to develop skill in the use of drafting equipment with a working knowledge of orthographic projections, lettering, auxiliary views, sectional views, tracings and pictorial representation of machine parts.

2 3-hour laboratory periods.

Credit, 2.

Mr. LAKE, Mr. GROW.

2. (II) ENGINEERING DRAWING II.—This course is designed to develop further skill in the use of drafting equipment and give practice in the making of working drawings through the study of dimensioning, fastenings, conventional representations, detail and assembly drawings, and reading of working drawings. Graphs, and intersection and development problems will also be studied.

2 3-hour laboratory periods.

Credit, 2.

Mr. LAKE, Mr. GROW.

Prerequisite, Mechanical Engineering 1.

3. (I) DESCRIPTIVE GEOMETRY.—The course encompasses a study of the graphical methods applicable to engineering problems. Its content consists of the principles of orthographic projections, problems relating to lines and planes, graphic computations, polyhedrons, curved surfaces, warped surfaces and practical applications.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. LAKE, Mr. SOBALA.

Prerequisite, Mechanical Engineering 2.

23. (I) SHOP.—The course is designed primarily for engineers other than mechanical. Approximately half the semester is spent in woodworking, pattern making, and welding; in the other half the student gains experience in the machine shop, where he becomes familiar with the various machine and hand tools used in metal working.

2 4-hour laboratory periods.

Credit, 3.

Mr. LAKE, Mr. PUSHEE, Mr. PATTERSON.

27. (Summer) SHOP.—In the first part of the course woodworking and pattern making experience is gained on machines and with hand tools at the bench. The course then proceeds to the various methods of welding.

2 4-hour laboratory periods.

Credit, 3.

Mr. PUSHEE, Mr. PATTERSON.

28. (Summer) MACHINE SHOP.—A knowledge of metalworking equipment is obtained by using the fundamental machine tools such as the lathe, planer, shaper, milling machine and drill press. A reasonable

amount of bench work is included. Classroom work is devoted to the theory of machine tool operation, fits, tolerances and measurement.

2 4-hour laboratory periods.

Credit, 3.
Mr. LAKE.

59. (I) and (II) MATERIALS OF CONSTRUCTION.—Properties of engineering materials; failure by (a) exceeding the elastic limit, (b) creep, (c) fatigue, and (d) corrosion. The crystalline nature of metals. Properties and uses of the structural metals, wood, stone, clay products, cementing materials, concrete, plastics, protective coatings, and water.

2 class hours.

Credit, 2.
Mr. KEYSER.

Prerequisites, Chemistry 1; Physics 26.

63. (I) ENGINEERING THERMODYNAMICS I.—This course is a treatment of the application of the laws of heat to various energy-transforming devices. Topics include ideal and actual cycles of steam, internal combustion engines, and air compressors together with problems pertaining to these machines, energy transformations in fluid flow, variable specific heats and mixtures of gases.

4 class hours.

Credit, 4.
THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 30 or 32.

64. (II) ENGINEERING THERMODYNAMICS II.—A continuation of the work of Course 63. Study will be made of liquids and vapors, thermodynamic cycles, energy transformations and the transfer of heat, together with engineering problems pertaining to these devices.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63.

65. (I) HEAT ENGINEERING I.—This course is a survey of the field of applied energy and is designed for engineering students outside of the mechanical engineering field. The application of the laws of heat to energy transforming devices is studied, but not as extensively as in Courses 63 and 64. A study will be made of gases, vapors, fuels, combustion, heat transfer, measurement of power, and internal combustion engines.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 6.

66. (II) HEAT ENGINEERING II.—A continuation of the work of Course 65. Air compressors, fans, refrigeration, and air conditioning, turbines, jet propulsion and power plants will be studied.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisite, Mechanical Engineering 65.

67. (I) MECHANICAL INSTRUMENTATION LABORATORY.—The calibration and application of instruments used in the testing of mechanical engineering apparatus.

1 3-hour laboratory period.

Credit, 1.

Mr. WOLOWICZ, Mr. DITTFACH, Mr. CARD.

Prerequisite, Mechanical Engineering 63 concurrently.

68. (II) KINEMATICS.—Principles of mechanism, including velocity and acceleration diagrams, instant centers, gear teeth and gear trains, cams, and various speed transmissions.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES, Mr. SOBALA.

Prerequisites, Mechanical Engineering 1; Civil Engineering 52.

72. (II) FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are then applied to the study of the iron-iron carbide diagram, the S-curve, heat treatment of steel and the properties and uses of the other principal engineering metals. Laboratory work stresses metallographic and radiographic technique.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER.

Prerequisite, Mechanical Engineering 59 or Chemistry 66.

75. (I) STEAM POWER PLANTS.—This course is a study of the steam power plant, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, and engineering problems involved in design and operation.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SWENSON.

Prerequisite, Mechanical Engineering 64.

76. (II) REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SWENSON, Mr. ATHERTON.

Prerequisite, Mechanical Engineering 64.

77. (I) INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included.

3 class hours.

Credit, 3.

Mr. DITTFACH, Mr. CARD.

Prerequisite, Mechanical Engineering 64.

79. (I) MECHANICAL ENGINEERING LABORATORY I.—Tests of fuels and lubricants. Performance tests of steam engines and turbines, gasoline

and Diesel engines, fans, hydraulic apparatus, refrigeration systems and other typical engineering equipment. Emphasis on laboratory procedure and orderly presentation of results.

2 3-hour laboratory periods.

Credit, 2.

Mr. WOLOWICZ, Mr. SWENSON, and DEPARTMENT.

Prerequisites, Civil Engineering 76 or 75 concurrently; Mechanical Engineering 64 or 66; Mechanical Engineering 67 for Mechanical Engineering majors.

80. (II) MECHANICAL ENGINEERING LABORATORY II.—This course continues the work of the first semester in more advanced phases.

2 3-hour laboratory periods.

Credit, 2.

Mr. WOLOWICZ, Mr. SWENSON and DEPARTMENT.

Prerequisite, Mechanical Engineering 79.

82. (II) FLUID MACHINERY.—Application of the principles of fluid mechanics to the theory of impulse and reaction water wheels, centrifugal pumps and compressors, and axialflow blowers. Consideration is also given to the design of high pressure reciprocating and rotary pumps, hydraulic transmissions, sequence valves, etc., and their use in hydraulic circuits.

3 class hours.

Credit, 3.

Mr. WOLOWICZ.

Prerequisite, Civil Engineering 76.

83. (I) MACHINE DESIGN.—Principles involved in the design of various machine parts including fastenings, shafts, belts, bearings, gears, and pressure vessels.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisites, Civil Engineering 51 or 53; Mechanical Engineering 68.

85. (I) DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers.

3 class hours.

Credit, 3.

Mr. WOLOWICZ.

Prerequisites, Civil Engineering 52; Mechanical Engineering 68.

86. (II) ADVANCED MACHINE DESIGN.—A continuation of Course 83. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisite, Mechanical Engineering 83.

88. (II) STEADY FLOW MACHINERY.—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus.

3 class hours.

Credit, 3.

Mr. SWENSON.

Prerequisites, Mechanical Engineering 64 or 66; Civil Engineering 76.

90. (II) ADVANCED METALLURGY.—Mechanical metallurgy covering the behavior of metals in the plastic state; the shaping of metals by mechanical means such as drawing, rolling, spinning, etc.; the primary methods of metal fabrication such as casting, welding, powder metallurgy, electroforming; metallurgical applications of radiography.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER.

Prerequisite, Mechanical Engineering 72.

91. (I) PROFESSIONAL SEMINAR.—For senior and graduate students only. Presentation of papers on various important subjects in the field of mechanical engineering, with principal emphasis on recent developments.

Credit, 1.

THE DEPARTMENT.

Industrial Engineering

25. (I) MANUFACTURING PROCESSES.—The methods of producing and fabricating the basic engineering materials: metals, cementing materials, ceramics, plastics, rubber, and lumber. Production methods (excluding machining) of metal parts and their assembly in a typical mass production industry is discussed. Laboratory periods involve inspection trips and movies.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. KEYSER.

26. (Summer) TOOL ENGINEERING.—This course includes the determination of the manufacturing operations necessary to produce a finished product. This is followed by consideration of the principles embodied in the design of jigs, fixtures, dies, and gauges necessary to perform each operation. The economics of tooling as influenced by intermittent or continuous type manufacturing and the effect of volume are also included.

3 44-hour weeks.

Credit, 3.

Mr. LAKE.

51. (I) INDUSTRIAL MANAGEMENT.—A course designed to acquaint the student with the principles of industrial engineering and their application to the solution of the problems of industrial plant operation.

3 class hours.

Credit, 3.

Mr. WEAVER.

75. (I) JOB EVALUATION.—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies.

3 class hours.

Credit, 2.

Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

76. (I) TIME STUDY.—A study of the principles involved in the establishment of production standards and their application in the man-

agement functions of cost accounting, estimating, production control, incentives, budgetary control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. WEAVER.

Prerequisites, Industrial Engineering 75.

77. (I) PRODUCTION CONTROL.—A study of the principles used to regulate production activities in keeping with the manufacturing plan.

3 class hours.

Credit, 3.
Mr. EMERSON.

Prerequisite, Industrial Engineering 51.

78. (II) FACTORY PLANNING AND LAYOUT.—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. SOBALA.

Prerequisites, Mechanical Engineering 2; Industrial Engineering 51.

80. (II) PLANT BUDGETARY CONTROL.—A study of the principles used to pre-determine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant.

3 class hours.

Credit, 3.
Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

82. (II) WORK SIMPLIFICATION.—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. WEAVER.

Prerequisite, Mechanical Engineering 68.

86. (II) INDUSTRIAL MANAGEMENT.—Designed for students other than industrial engineers. A broad course dealing with the many problems encountered in a modern industry. Topics include types of organization, management, plant location, arrangement of equipment, product design, methods of production control, costs, wage payment systems and personnel relations.

3 class hours.

Credit, 3.
Mr. EMERSON.

88. (II) MOTION AND TIME STUDY.—This course covers the combined fields of motion study and time study for junior and senior students outside the industrial engineering field.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. SOBALA.

92. (I) PROFESSIONAL SEMINAR.—For seniors and graduate students.
Credit, 1.

ENGLISH

Professor RAND, Professor GOLDBERG, Professor HELMING, Professor TROY, Associate Professor O'DONNELL, Assistant Professor HERRIGAN, Assistant Professor DU BOIS, Assistant Professor VARLEY, Assistant Professor LANET†, Assistant Professor ALLEN, Assistant Professor WILLIAMS, Assistant Professor KOEHLER, Mrs. WRIGHT, Mr. KAPLAN, Mr. MARCUS, Miss TARANTINO, Mr. BARRON, Mr. MITCHELL.

Composition

1. (I) 2. (II) ENGLISH COMPOSITION.—Intended to teach straight thinking, sound structure, clear and correct expression. Scheduled hours include Speech 3. (I) 4. (II).

2 class hours.

Credit, 2.

THE DEPARTMENT.

81. (I) (II) CREATIVE WRITING.—A course in critical and imaginative composition based upon the examples of standard authors and the experience of the student. It provides an opportunity for work in description, narrative, verse and drama as well as in exposition.

3 class hours.

Credit, 3.

Mr. KOEHLER, Mr. VARLEY, Mr. LANE, Mr. ALLEN, Mr. WILLIAMS.

Prerequisite, a mark of A or B in English 2 (U. of M.) or permission of instructor.

83. (I) (II) TECHNICAL WRITING.—For majors in engineering. A course in factual and inductive exposition with special emphasis upon process reports and theses.

2 class hours.

Credit, 2.

Mr. KAPLAN.

Prerequisites, English 1, 2.

84. (II) TECHNICAL WRITING.—For students not majoring in engineering. A course in factual and inductive exposition with special emphasis upon library research and the preparation of reports, essays, and theses.

3 class hours.

Credit, 3.

Mr. ZAITZ, Mr. KAPLAN.

Prerequisites, English 1, 2.

Literature

25. (I) 26. (II) HUMANE LETTERS.—A general reading course based upon a chronological selection of masterpieces, both classical and English.

3 class hours.

Credit, 3.

THE DEPARTMENT.

50. (II) CHAUCER.—A study of Chaucer's development and pre-eminence as a creative artist and an attempt to appreciate his humanism.

3 class hours.

Credit, 3.

Mr. HELMING.

† On leave of absence.

51. (I) THE RENAISSANCE IN ENGLAND.—A study of various aspects of the Renaissance as revealed in such writers as Spenser, Bacon, Sir Thomas Browne, Burton, and Hobbes. Special emphasis is given to Spenser's *Faerie Queene*.

3 class hours.

Credit, 3.
Mr. TROY.

53. (I) LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND (1950-51).—A study of lyrical poets such as Sidney, Campion, Jonson, Herrick, Lovelace, Suckling, Carew, Donne, Herbert, Vaughan, Crashaw, Traherne and Marvell. Special emphasis is given to the "Metaphysical" tradition.

Given in alternate years.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

54. (II) MILTON.—The development of the mind and art of Milton as a Renaissance writer. Emphasis is placed upon *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

3 class hours.

Credit, 3.
Mr. GOLDBERG, Mr. HELMING.

55. (I) SHAKESPEARE.—This course is based upon the reading of about twenty-five of Shakespeare's plays, and attempts both to indicate the evolution of the dramatist and to emphasize the various phases of his art.

3 class hours.

Credit, 3.
Mr. RAND.

67. (I) AMERICAN PROSE.—A course in the chief American prose writers of the nineteenth and twentieth centuries. Among the authors studied are Emerson, Thoreau, Hawthorne, Melville, Mark Twain, Henry Adams, and Henry James.

3 class hours.

Credit, 3.
Mr. O'DONNELL.

57. (I) ELIZABETHAN DRAMATISTS.—A study of Elizabethan Drama, exclusive of Shakespeare, with special consideration of the plays of such men as Lyly, Peele, Green, Kyd, Marlowe.

3 class hours.

Credit, 3.
Mr. ———.

58. (II) ELIZABETHAN DRAMATISTS.—A study of English drama from the death of Elizabeth to the closing of the theaters. Special consideration will be given to the plays of Jonson, Beaumont, Fletcher, Webster, Middleton, Massinger, and Shirley.

3 class hours.

Credit, 3.
Mr. O'DONNELL.

59. (I) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A study of the literature of the Augustan Age, with special emphasis on the writing of Swift and Pope.

3 class hours.

Credit, 3.
Mr. TROY.

60. (II) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A continuation of English 59, but may be elected independently. A study of the literature of the later Eighteenth Century with special emphasis on the Johnson Circle.

3 class hours.

Credit, 3.
Mr. TROY.

61. (I) ROMANTIC POETRY (1950-51).—A study of the Lake Poets (primarily Wordsworth and Coleridge) and their precursors. Given in alternate years.

3 class hours.

Credit, 3.
Mr. RAND.

62. (II) ROMANTIC POETRY (1950-51).—A continuation of English 61 but may be elected independently. A study of Byron, Shelley and Keats. Given in alternate years.

3 class hours.

Credit, 3.
MISS HARRIGAN.

63. (I) AMERICAN POETRY.—A study of American poetry from Colonial times to 1900, with special emphasis upon the work of Freneau, Bryant, Emerson, Longfellow, Whittier, Poe, Whitman, and Emily Dickinson.

3 class hours.

Credit, 3.
Mr. DuBois.

69. (I) VICTORIAN POETRY (1951-52).—A study of Tennyson and Browning. Given in alternate years.

3 class hours.

Credit, 3.
Mr. RAND.

65. (I) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A study of the chief Romantic prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Coleridge, Lamb, Hazlitt, DeQuincey, Carlyle, and Ruskin.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

66. (II) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A continuation of English 65, but may be elected independently. A study of the chief Victorian prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Macaulay, Newman, Arnold, Huxley, Pater, and Stevenson.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

68. (II) MODERN DRAMA.—This course traces the development of English and American drama from the time of Ibsen to the present day. Its purpose is to impart an intelligent and enthusiastic interest in the theatre of the twentieth century.

3 class hours.

Credit, 3.
Mr. RAND, Mr. WILLIAMS.

73. (I) ENGLISH PROSE FICTION. A course designed to illustrate the development of English prose fiction, with emphasis upon the great novels of the eighteenth and nineteenth centuries.

3 class hours.

Credit, 3.

Mr. HELMING, Mr. ALLEN.

71. (I) BIOGRAPHY.—The history of the biography as a literary type; discussion of leading biographers from Boswell to Maurois, with special emphasis upon the development of the modern biographical method.

3 class hours.

Credit, 3.

Mr. HELMING.

72. (II) THE BIBLE AS LITERATURE.—A study of the King James version of the Bible, with emphasis upon the Hebrew as discernible in translation, the poetic qualities characteristic of Tudor England, and the varied influence of the Bible upon subsequent English poetry.

Mr. RAND, Mr. GOLDBERG.

74. (II) GREEK CLASSICS IN TRANSLATION.—Readings and discussion of the epics of Homer, representative dramas of Aeschylus, Sophocles, Euripides, and Aristophanes, the "Socratic" dialogues of Plato, and Thucydides' history of the Peloponnesian War. Intended to acquaint students with the famous myths and stories of classical antiquity, and the literary forms and ideas which have contributed most to subsequent literatures.

3 class hours.

Credit, 3.

Mr. HELMING, Mr. TROY.

76. (II) MODERN POETRY.—This course attempts to trace the spirit of twentieth century poetry from such authors as Hardy, Whitman, and Emily Dickinson to those of the present day.

3 class hours.

Credit, 3.

Mr. RAND, Miss HERRIGAN.

77. (I) THE MODERN NOVEL.—An analytical presentation of eleven novels written between 1890 and 1930, in which the expanding form and the extension of critical themes will be stressed.

3 class hours.

Credit, 3.

Mr. VARLEY.

79. (I) LITERARY CRITICISM (1951-52).—A study of major critical attitudes and principles, in relation to philosophic background and to practice. Emphasis is placed upon important critics and theorists from Plato and Aristotle through those of the eighteenth century. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

80. (II) LITERARY CRITICISM (1951-52).—A continuation of English 79, but may be elected independently. Emphasis is placed upon important critics and theorists of the nineteenth and twentieth centuries. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

ENTOMOLOGY

Professor ALEXANDER, Professor SWEETMAN, Assistant Professor HANSON,
Assistant Professor SHAW, Dr. SMITH, Mr. FIELD.

26. (II) GENERAL AND FIELD ENTOMOLOGY.—The lectures are devoted to a brief survey of the entire field of entomology; structure and metamorphosis; the more important methods and materials for control of injurious species; a survey of the more conspicuous and important insects with particular attention to the fauna of New England. A laboratory period will be devoted to the preparation and formation of a collection of insects. Until about April 10th, this work will be done indoors and will consist of lectures and practical work preparatory to the field work after that date. Collections made by the students are studied in later courses.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 M. F.; 1:00-2:50 M. Tu. W. Th. F.

Mr. ALEXANDER, Miss SMITH.

51. (I) PESTS OF SPECIAL CROPS.—For students not specializing in entomology who desire a more complete knowledge of the insects connected with their major lines of work. Work in the laboratory consists of identification, life-history studies and control measures of important insect pests. Work of this nature is available on pests of field crops, market-garden crops, fruits, flowers, shade trees and shrubs, forest trees, household articles, domestic animals, and man.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 M.; 1:00-2:50 Tu.; 2:00-3:50 Th.

Mr. SHAW.

Prerequisite, Entomology 26.

53. (I) APPLIED ENTOMOLOGY.—Studies on the more important insect pests, their life-histories, damage, identification, and methods of control. Special attention is devoted to the use of entomological literature, methods of preparing scientific papers, and the general principles of insect control.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 W.; 3:00-4:50 M. F.

Mr. FIELD.

Prerequisite, Entomology 26.

55. (I) 56. (II) CLASSIFICATION OF INSECTS.—Laboratory work on the identification of the major orders of insects. In Course 56, the immature stages of insects, with particular stress on their structure and recognition.

3 2-hour laboratory periods.

Credit, 3.

8:00-9:50 Tu. Th. S.

Mr. ALEXANDER, Miss SMITH.

Prerequisites, Entomology 26; Entomology 57, previously or concurrently.

57. (I) INSECT MORPHOLOGY.—The lectures treat of the internal and external anatomy of insects, particular stress being placed on those structures needed in classification, for use in the parallel Course 55. In the laboratory, the internal and external anatomy of the more important

groups is studied, with emphasis on those characters most used in the determination of insects.

1 class hour; 3 2-hour laboratory periods.

10:00-10:50 F.; 1:00-2:50 M. Tu. F.

Prerequisite, Entomology 26.

Credit, 4.

Mr. HANSON.

60. (II) STRUCTURAL PEST CONTROL.—For students specializing in entomology, especially those desiring to enter the structural pest field, and others interested in gaining knowledge of methods of combating insect and rodent pests. The emphasis will be placed on the control of those pests attacking buildings and other structures, foods, fabrics, and other stored products in private homes or other establishments. The life history, feeding habits, methods of reproduction, and dispersal of the various species will be stressed in so far as these influence control measures.

2 class hours.

11:00-11:50 M. F.

Prerequisite, Zoology 1; Entomology 26 desirable.

Credit, 2.

Mr. SWEETMAN.

72. (II) FOREST AND SHADE TREE INSECTS.—The lecture work deals with the principles and methods of controlling insects which attack shade trees, forests and forest products. The laboratory periods are devoted to a study of the more important species, their identification, biology, and specific control measures.

1 class hour; 2 2-hour laboratory periods.

9:00-9:50 W.; 1:00-2:50 M. F.

Prerequisite, Entomology 26; 53, 55, 56, and 57 desirable.

Credit, 3.

Mr. HANSON, Mr. FIELD.

74. (II) MEDICAL ENTOMOLOGY.—Relationships of insects and their allies to the transmission of diseases of man and animals. Especial attention is given to such transmission under war conditions, and to camp sanitation and similar topics.

1 class hour; 2 2-hour laboratory periods.

10:00-10:50 W.; 3:00-4:50 Tu. Th.

Prerequisite, Entomology 26.

Credit, 3.

Mr. SHAW.

79. (I) ANIMAL ECOLOGY.—Designed for students specializing in entomology, zoology, and related fields. The course deals with the relation of animals to their environment, covering the physical factors as temperature, moisture, light, etc., and biotic factors as neighbors, competitors, predators, etc. Both terrestrial and aquatic communities are studied. The student is shown not only that animals do things, but why they make definite responses to the environmental factors. Actual measurements of the environmental factors and responses of the animals in the field and laboratory are included.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 M. F.; 3:00-4:50 M.

Prerequisite, Entomology 26 or Zoology 1 or equivalent.

Credit, 3.

Mr. SWEETMAN

80. (II) INSECT CONTROL.—The scientific basis of insect control is considered from the chemical, biological, ecological, mechanical, and legislative approaches. Special emphasis is placed on the composition,

manufacture, preparation, and reaction of insecticides, and the use of resistant hosts, micro-organisms and the larger parasites and predators that might be used in the control of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 M.; 3:00-4:50 M. F.

Mr. SWEETMAN.

Prerequisites, Entomology 53, 55, and 57; 79 and 81 desirable.

81. (I) PHYSIOLOGICAL ENTOMOLOGY.—A detailed consideration is given to the organ systems, showing the functions such as nutrition, respiration, and growth, and the relationship of physiology to behavior. A portion of the laboratory time will be devoted to assigned individual problems dealing with any phase of insect biology or control and conducted on a research basis.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 Th.; 3:00-4:50 W. F.

Mr. SWEETMAN.

Prerequisite, Entomology 26; 55, 56, and 57 desirable.

87. (I) 88. (II) SPECIAL PROBLEMS IN ENTOMOLOGY.—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification. Intended primarily to introduce qualified students to research methods in some branch of entomology. Excess departmental credits are necessary for election.

Hours by arrangement.

Credit, 1, 2, or 3.

THE DEPARTMENT.

Prerequisites, Entomology 26, 53, 55, 57, and should be preceded or accompanied by any other courses in the restricted field of the problem.

90. (II) EVOLUTION.—In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind; the evolution of human intelligence, and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, variation, and similar topics, with particular reference to their application to human welfare.

2 class hours.

Credit, 2.

10:00-10:50 M. F.

Mr. HANSON.

Apiculture

66. (II) INTRODUCTORY BEEKEEPING.—The laboratory work consists of a study of beekeeping equipment and the methods of assembling this material; a study of pollen and honey plants; spring management. The lectures are intended to give the student a broad grasp of the entire field of beekeeping, considering such subjects as history; statistics of bee-

keeping in America; the races of bees; methods of management; bee-diseases; pollination; queen-rearing.

2 class hours; 1 2-hour laboratory period.
11:00-11:50 M. F.; 1:00-2:50 M.

Credit, 3.
Mr. SHAW.

85. (I) ADVANCED BEEKEEPING.—The laboratory work consists of fall management, care of the honey crop, preparation of colonies for wintering, bee-diseases, and some simple types of biometrical problems. The lectures consider, among other things, the physical and chemical characteristics of honey and wax; chemical tests to detect adulteration of honey; bee-diseases; and biometry.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. SHAW.

Prerequisite, Entomology 66.

BIOLOGICAL FIELD STUDIES

Professor VINAL.

51. (I) 52. (II) BIOLOGICAL FIELD STUDIES (1949-50).— Course 51 is devoted to field studies with fall flowers, trees in winter, wood specimens, evergreens and the making of terraria. Course 52 deals with topography, glaciers, minerals, birds, and spring flowers with special emphasis on methods, skills and techniques of leadership in nature education. These courses are required of students specializing in recreational leadership. Enrollment limited to twenty-five. Given in alternate years.

1 class hour; 2 2-hour field periods.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. VINAL.

61. (I) 62. (II) PUBLIC RELATIONS IN NATURE RECREATION.— For juniors and seniors specializing in recreational leadership; others may elect by special arrangement with the instructor. A course in public contacts designed to bring to the attention of the student the natural history background with which one must be familiar if he is to succeed in public work. Community facilities, population, land use, climate, housing, good rural life in relation to community planning and nature recreation, are some of the factors to be considered. Each student will be expected to make a survey of his home town.

3 class hours.
10:00-10:50 Tu. Th.

Credit, 3.
Mr. VINAL.

71. (I) 72. (II) ADVANCED BIOLOGICAL FIELD STUDIES (1950-51).

This course is devoted to field studies with cultivated plants, bog plants, the seabeach, salt water and fresh water aquaria, shell fish, amateur weather bureau, conservation, camping, education, the observation of bee hive, gardening, school and community forests, animals in winter. Community service is expected. Enrollment limited to twenty-five. Given in alternate years.

1 class hour; 2 2-hour field periods.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. VINAL.

73. (I) 74. (II) SPECIAL PROBLEMS IN NATURAL SCIENCE.—For juniors and seniors specializing in recreational leadership. It is expected that the problem will relate to the immediate career which the student has in view.

3 class hours.

Hours by arrangement.

Credit, 3.

Mr. VINAL.

FINE ARTS

Assistant Professor ROBERTSON, Assistant Professor ALVIANI,
Mr. CONTINO.

Art

27. MODELING.—A course in elementary modeling, of seeing, analyzing, and reproducing form in clay and modeling wax to develop sculptural technique.

6 laboratory hours.

Credit, 3.

Mr. ROBERTSON.

28. MODELING.—A continuation of Course 27 in advanced design and the making of plaster casts from original problems in small sculpture, such as plaques, masks, and medals or other such pieces.

6 laboratory hours.

Credit, 3.

Mr. ROBERTSON.

Prerequisite, Art 27.

31. (I) ELEMENTARY DESIGN.—For women. Elementary principles of design as applied to textiles, fabrics, interior decorations, etc.

3 2-hour laboratory periods.

Credit, 3.

Mr. MACIVER.

33. (I) FREEHAND DRAWING.—A non-professional course in elementary drawing and painting in various media in black and white. The work is more or less personal and is adapted to the individual capacities and backgrounds of each student as far as possible.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

34. (II) FREEHAND DRAWING.—This non-professional course is essentially one in which the use of color is stressed in various media, freehand drawing is emphasized and paintings in still-life and landscape subjects are produced.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

75. (I) ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts, leading toward the enjoyment of art and its application to every day life.

3 class hours.

Credit, 3.

Mr. OTTO.

77. (I) EARLY AND MEDIEVAL ART.—An appreciative survey of art and history from early times through the medieval period. Works in painting, sculpture, architecture, and the minor arts are examined in the light of their contributions to the history of civilization, and to the development of art forms.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. ROBERTSON.

78. (II) RENAISSANCE AND MODERN ART.—This course is a continuation of Art 77, bringing the historical survey of art down to modern times. While it is advisable to take both courses, either may be elected independently.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. ROBERTSON.

Music

As an addition to the courses listed below, the department can make arrangements with thoroughly well-qualified teachers to offer private instruction, without course credit, in voice, piano, organ, violin, and viola.

25. (I) 26. (II) ELEMENTARY INSTRUMENTAL OR VOCAL ENSEMBLE.—Admission by permission of instructor. Not open for credit to freshmen, to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course is designed to improve the playing of instruments and/or the use of the singing voice, and to create further appreciation of music by the most direct of teaching methods—actual performance. Students electing this course should take both 25 and 26.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

27. (I) 28. (II) INTERMEDIATE INSTRUMENTAL OR VOCAL ENSEMBLE. Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. A continuation of Music 26, for the training of performers in small groups, such as string quartet, two piano, and/or mixed vocal octet, female trio, etc. Students electing this course should take both 27 and 28.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 26.

29. (I) 30. (II) ADVANCED INSTRUMENTAL OR VOCAL ENSEMBLE.—Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course presents to the student various techniques of solo performance, of program planning, and of teaching beginners in vocal or instrumental music. Those electing this course should take both 29 and 30.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 28.

51. (I) and (II) **DISCOVERING MUSIC.**—This elementary course is non-technical in nature and is designed primarily for those students who would like to acquire a general background and knowledge of this great art. With learning to listen its motive, the course deals with the elements of music, forms in music, musical compositions, and with selected composers. Excerpts from the works of great masters will be used as illustrations.

3 class hours.

10:00-10:50 or 11:00-11:50 M. W. F.

Credit, 3.

Mr. ALVIANI.

52. (I) and (II) **GREAT PERIODS OF MUSIC.**—This course attempts to transport the student into the spirit of each of several great periods of music—Renaissance, Baroque, Classic, Romantic, and Modern—so that he will feel their quality, understand their enthusiasms, their technical resources and limitations, and their habits of thought and style.

3 class hours.

1:00-1:50 or 2:00-2:50 Tu. W. Th.

Credit, 3.

Mr. CONTINO.

Prerequisite, Music 51.

55. (I) **ADMINISTRATION AND DIRECTION OF CHORAL ORGANIZATIONS.**—The aim of this course is to demonstrate the methods of developing school and community choral groups. Conducting techniques are taught and factors of good vocal performance are studied. The student will conduct choral groups during the term. Previous musical experience is desirable.

2 class hours.

4:00-4:50 W., one hour by arrangement.

Credit, 2.

Mr. ALVIANI.

56. (II) **ADMINISTRATION AND DIRECTION OF INSTRUMENTAL ORGANIZATION.**—The student is introduced to the different types of instrumental music, the problems of balancing instrumentation, and to the functioning of orchestral instruments. Conducting techniques will be practiced before instrumental groups of various sizes. Previous musical experience is desirable.

2 class hours.

4:00-4:50 W., one hour by arrangement.

Credit, 2.

Mr. CONTINO.

61. (I) **GREAT MASTERPIECES OF MUSIC.**—The course includes the history and analysis of selected compositions most frequently heard in the concert hall, on records, and on the radio. The selected works will be masterpieces composed during the last two hundred years by the best known composers.

3 class hours.

9:00-9:50 M. W.

Credit, 3.

Mr. CONTINO.

Prerequisite, Music 51 or 52 or permission of instructor.

62. (I) **MUSIC OF THE TWENTIETH CENTURY.**—By a study of musical trends, during the twentieth century, this course shows the aims, accomplishments, and future plans of the recent and present day composers. Compositions of this century are heard and studied as illus-

trations of the trends which have caused the twentieth century to be called one of unrest and experiment for music.

3 class hours.

9:00-9:50 M. W. F.

Prerequisite, Music 51 or 52 or permission of instructor.

Credit, 3.

Mr. ALVIANI.

75. (I) FUNDAMENTALS OF MUSIC.—This is a correlated study of theory, written and keyboard harmony, ear training, form and analysis. These fundamentals are applied to improve the student's musical appreciation. The course is non-technical in its approach and no previous musical experience is required.

3 class hours.

Credit, 3.

11:00-11:50 Tu., 12:00-12:50 W. Th.

Mr. ALVIANI, Mr. CONTINO.

76. (I) FUNDAMENTALS OF MUSIC.—A continuation of Music 75. More detailed musical examples are used and further study of the musical fundamentals is made. Primarily, the student will develop more mature consideration of the multifarious musical forms and techniques.

3 class hours.

Credit, 3.

11:00-11:50 Tu., 12:00-12:50 W. Th.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 75.

FLORICULTURE

Professor THAYER, Assistant Professor HUBBARD, Assistant Professor ROSS,
Mr. DUNHAM.

26. (II) GARDEN MATERIALS.—A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants, and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture, and uses of the various plants are considered as well as identification of materials.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. F.; 3:00-4:50 M.

Mr. DUNHAM.

51. (I) GREENHOUSE MANAGEMENT.—This course is intended to familiarize students with the methods and principles involved in the management of greenhouses and greenhouse crops; history and development of the floricultural industry, preparation of soils, fertilizers, potting, watering, ventilation, control of insects and diseases, methods of plant propagation, forcing plants, soilless methods of plant culture. At some time during the semester the members of the class will be required to take a one-day trip to visit large commercial establishments at an approximate cost of five dollars.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 F.

Mr. THAYER, Mr. DUNHAM.

52. (II) FLORAL ARRANGEMENT.—A study of the principles involving the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangements, corsages, wedding bouquets, table decorations,

home, church, and other interior decorations. A study of color and color harmony as applied to such work. This course is limited to ten students, preference being given to students specializing in floriculture and landscape architecture.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. THAYER, Mr. ROSS.

8:00-8:50 Th.; 1:00-2:50 M. F.

54. (II) GREENHOUSE CONSTRUCTION AND HEATING.—The location, types, arrangement, construction, cost, equipment, heating, and ventilation of greenhouse structures; the drawing of plans and study of specifications. Special emphasis laid on heating problems.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 F.

Mr. THAYER, Mr. DUNHAM.

58. (II). AMATEUR FLORICULTURE.—This course is intended primarily for major students in the School of Home Economics and for other women students. Three phases of floriculture will be considered: (1) the arrangement and use of cut flowers for decorative purposes in the home and elsewhere, (2) house plants, methods of propagation, (3) garden flowers and their uses on the home grounds.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu.; 1:00-1:50 Th.; 1:00-2:50 W. or 2:-3:50 Th.

Mr. THAYER, Mr. ROSS.

75. (I) 76. (II) COMMERCIAL FLORICULTURE.—A detailed study of the cultural methods for the important commercial cut-flower crops and potted plants. The marketing of flowers and plants, including the management of wholesale markets and retail stores, a study of systems of record keeping, cost analysis, inventory methods, and other phases of this important part of the floricultural industry. Trips may be taken to nearby commercial establishments.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu., Th.; 1:00-2:50 Tu.

Mr. HUBBARD.

Prerequisite, Floriculture 51.

79. (I) CONSERVATORY PLANTS (1950-51).—Alternates with Course 81 for students specializing in floriculture. A study of the foliage and flowering plants used in conservatory work; methods of propagation; identification of materials.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

3:00-3:50 W.; 1:00-2:50 F.

Mr. THAYER, Mr. DUNHAM.

81. (I) HERBACEOUS GARDENS AND BORDERS.—Alternates with Course 79 for students specializing in floriculture; given annually for students specializing in landscape architecture. This course is a continuation of Course 26 with emphasis on the use of herbaceous materials in various types of planting of borders and gardens.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

1:00-1:50 Th.; 2:00-4.50 Th., one laboratory hour by arrangement.

Mr. HUBBARD.

Prerequisite, Floriculture 26.

82. (II) SEMINAR.—For seniors specializing in floriculture. Presentation and discussion of research work in floriculture and other related fields.

1 class hour; 4 laboratory hours.

Credit, 3.

THE DEPARTMENT.

FOOD TECHNOLOGY

Professor FELLERS, Associate Professor LEVINE, Assistant Professor KRANZ,
Dr. FITZPATRICK,* Dr. NEBESKY.

51. (I) INTRODUCTORY COURSE.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

8:00-8:50 Tu.; 1:00-4:50 W. or Th.

Mr. FELLERS.

52. (II) FOOD PRODUCTS AND ADJUNCTS.—This is a continuation of Course 51. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments, and the preservation of meats, poultry, and vegetables. The properties and uses of sugars, syrups, brines, enzymes, acids, salt, pectin, preservatives and antioxidants are considered. Experience is given in the use and handling of instruments and equipment. Enrollment is limited to 25.

Credit, 3.

2 class hours; 1 2-hour laboratory period.

8:00-8:50 Tu. Th.; 1:00-2:50 W. or Th.

Mr. FELLERS.

Prerequisite, Food Technology 51.

61. (I) INDUSTRIAL TECHNOLOGY.—A survey of commercial practices in the manufacture and preservation of food products. This will involve a study of equipment, factory arrangement, sanitation, government regulations, and the operation of types of commercial equipment in quantity production.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

10:00-10:50 Th.; 1:00-4:50 M. or Tu.

Mr. LEVINE.

Prerequisites, Food Technology 52; Bacteriology 31.

62. (I) INDUSTRIAL TECHNOLOGY.—This is a continuation of Course 61. The class exercises will deal largely with a survey study of the sources of raw material, commercial methods of manufacture, packing and distribution of the more common foods. The important contributions of research to food technology will be studied. Laboratory work will include the formation of research projects, interpretation of research data, the use of preservatives, the simple analysis of foods and the commercial practices as applied to preservation of such materials as are available: fish, meats, poultry, and spring vegetables. The inspec-

* On leave of absence for military service.

tion and grading of canned food will be studied. Sometime during the semester a two-day field trip to food plants in the Boston area will be taken. The trip will cost the student about fifteen dollars.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. LEVINE.

Prerequisite, Food Technology 61.

71. (I) 72. (II) FOOD SCIENCE LITERATURE.—For seniors who specialize in food technology.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

THE DEPARTMENT.

75. (I) and (II) FOOD PRESERVATION.—For students not majoring in food technology. A survey is made of the causes of food spoilage and of the methods commonly used in preserving foods. The important food products are discussed with emphasis on raw materials used, processing methods and examination of packaged foods. Methods of detecting and preventing spoilage are studied. The laboratory exercises cover the preservation of the major food groups. The theory and use of the pressure cooker are included.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

12:00-12:50 Tu. Th.; 3:00-4:50 M. or Th.

Mr. NEBESKY.

82. (II) CONFECTIONS AND CEREAL PRODUCTS.—The materials offered in this course are as follows: the home manufacture of fruit preserves, candied and glacéed fruits, pastes, confections, candies, and other specialties. Approximately one-half the semester is devoted to elementary work in candy making. This course will also consider the principles of baking, doughs, various cereal products and dry mixes.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 M. F. or 3:00-4:50 M. F.

Mr. LEVINE.

85. (I) 86. (II) MARINE PRODUCTS TECHNOLOGY.—A survey of marine products of commerce and industry. Canning, curing, and freezing of seafoods. Chemical and microbiological aspects of the industry. By-products, industrial problems and scientific literature. Emphasis is placed on the New England fisheries.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Mr. FELLERS.

91. (I) ANALYSIS OF FOOD PRODUCTS.—Laboratory studies on the grading of foods, examination of foods for adulteration, testing accessory products for quality, and determining the causes of spoilage or deterioration in processed food products. Physical, chemical, microbiological, and microscopical methods will be employed. Enrollment limited to 18.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS.

Prerequisites, Food Technology 52; Bacteriology 31; Chemistry 30.

92. (II) EXAMINATION OF FOOD PRODUCTS.—For students specializing in food technology. This is a continuation of Course 91. It includes interpretation of analysis, sanitation and food laws, government grading of processed foods, use of manuals and the technical work of trade associations. Laboratory work includes use of all kinds of laboratory and field equipment and apparatus used in food plants. A separate laboratory section is given for Bacteriology and Public Health majors.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS, Mr. NEBESKY.

Prerequisite, Food Technology 91.

95. (I) and (II) INTRODUCTORY RESEARCH METHODS.—For food technology majors. The application of the fundamental sciences to food technology research.

Hours by arrangement.

Credit, 2.

THE DEPARTMENT.

FORESTRY AND WILDLIFE MANAGEMENT

Professor HOLDSWORTH, Professor TRIPPENSEE, Professor RHODES, Associate Professor RICH, Assistant Professor STICKEL, Mr. COLE,
Mr. MACCONNELL.

26. (II) DENDROLOGY.—The taxonomic features, silvical characteristics and geographical distribution of the principal forest trees of temperate North America, and the description of the forests in which they occur; identification of the native and naturalized woody plants occurring in the forests of the Northeastern United States, in summer and winter condition, by means of keys and first-hand examination.

2 class hours; 2 2-hour laboratory and field periods.

Credit, 3.

Mr. RHODES.

51. (I) FOREST MANAGEMENT OF WATERSHEDS.—For students majoring in bacteriology and public health. Admission on recommendation of student's major adviser. A study of forest site—water factor relationships; the improvement of watershed forests through applied silviculture; relative suitability of tree species for watershed uses; forest protection measures.

3 class hours; special field trips.

Credit, 3.

THE DEPARTMENT.

52. (II) FOREST PHOTOGRAMMETRY.—A course designed to familiarize the student with the use of aerial photographs in present-day forest management practice. Map making, forest inventory and other phases of forest management involving the application of photogrammetry are considered in detail. Field trips for checking photographic detail on the ground will be made. Texts and equipment costing about \$22.00 are required.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Mr. MACCONNELL, Mr. COLE.

53. (I) SILVICS.—Forest ecology as a foundation for silvicultural practice: the physiological basis of forest ecology; environmental factors, their effect upon vegetation, and how they are influenced by it; the development and silvical habits of the individual tree; the development, characteristics and classification of forest communities; plant indicators; methods for the study and analysis of vegetation and its environment.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.

Mr. RHODES.

54. (II) FOREST SOILS.—The structure, development and maintenance of forest soils; their relationship to applied silviculture and forest productivity; the literature of forest soils with special reference to American experience.

3 class hours.

Credit, 3.

Mr. RHODES.

55. (I) THE ELEMENTS OF FOREST MENSURATION.—Methods of determining the volume and value of the forest growing stock; type mapping as it pertains to timber cruising; methods of predicting growth of trees and stands; the field work includes mapping and timber estimating on a forest realistic in size and condition and the submission of an inventory report.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.

Mr. HOLDSWORTH, Mr. COLE.

56. (II) THE PRINCIPLES OF SILVICULTURE.—The methods of establishing and developing forest stands through the application of correct silvicultural practice. Intermediate cuttings and reproduction systems. Field work in applied silviculture, including the marking of forest stands for silvicultural treatment, is given on University forest property.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.

Mr. HOLDSWORTH, Mr. RHODES, Mr. STICKEL.

57. (I) FOREST ECONOMICS AND POLICY.—This course considers the forest as a resource yielding direct forest values and social benefits. The history of American forestry and the development of a forest policy together with the role of the forest in American economy are considered. Principles of American forest valuation.

3 class hours.

Credit, 3.

Mr. HOLDSWORTH.

59. (I) FOREST PROTECTION.—The principles of protecting forests from all harmful agencies but with special reference to the prevention and control of forest fires, insects, and disease. Other agencies are treated in accordance with their importance.

3 class hours.

Credit, 3.

Mr. STICKEL.

66. (II) WOOD ANATOMY AND IDENTIFICATION.—A basic anatomical study of wood elements, their various structural characteristics and func-

tions. Relation of structure and properties to use. Microscopic study of wood elements. Practice in identification.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. RICH.

75. (I) MANUFACTURE AND DISTRIBUTION OF FOREST PRODUCTS.—A study of the techniques of manufacturing direct forest products, including production and cost studies; also the seasoning, grading and special processing prerequisite to marketing.

3 class hours.

Credit, 3.
Mr. RICH.

76. (II) WOOD TECHNOLOGY.—The structure, composition and properties of wood in relation to its economic utilization; wood-liquid relationships as they affect seasoning, preservation, and technological processes for industrial purposes. A survey of the technological advances in the use of wood.

3 class hours.

Credit, 3.
Mr. RICH.

78. (II) HARVESTING OF FOREST PRODUCTS.—Methods of harvesting forest products in the several forest regions of the United States with a study of the uses of modern machinery and techniques. Cost control as a factor in the development of harvesting methods and policies.

3 class hours.

Credit, 3.
Mr. RICH.

80. (II) PRINCIPLES OF FOREST MANAGEMENT.—The organization of the forest for sustained yield management with a study of the underlying principles. Forest regulation. The preparation of forest management plans.

2 class hours; 1 4-hour field and laboratory period.

Credit, 3.
Mr. MACCONNELL.

81. (I) REGIONAL SILVICULTURE.—The practice of silviculture as applied in the several forest regions of the United States with special reference to the treatment of the tree species of commercial importance. Emphasis is given to the factors, both natural and economic, which govern silviculture in these regions.

3 class hours.

Credit, 3.
Mr. RHODES.

82. (II) SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY.—A study of forest tree seeds and their characteristics, production, harvest, storage, and qualities of germination. The production, distribution, and forest use of planting stock.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. STICKEL.

85. (I) AIR SEASONING AND KILN DRYING.—A study of the proper conditioning of wood products by air seasoning and kiln drying. Labora-

tory work includes studies of moisture relations in the wood and a study of kiln operation.

3 class hours.

Credit, 3.
Mr. RICH.

Wildlife Management

27. (I) CONSERVATION OF NATURAL RESOURCES.—Natural resources of the United States including soil, water, forests, wildlife, and the important minerals, the historic background of their use and their present status in relation to the social and economic welfare. Includes the discussion of various conservation problems in relation to national prosperity.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

70. (II) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of common game birds and mammals. Includes a study of natural habitats and methods of management.

1 class hour; 2 2-hour laboratory periods.

3:00-4:50 W. F.; lecture by arrangement.

Credit, 3.
Mr. TRIPPENSEE.

71. (I) WILDLIFE MANAGEMENT. (1950-51).—Life histories, ecology, and management of waterfowl. Includes a study of natural habitats and method of management. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. TRIPPENSEE.

72. (II) FOREST-ANIMAL RELATIONSHIPS.—Only for students majoring in Forestry. Effects of animals on the forest; the effects of forest practices on wild animal production; economic aspects of forest-animal relationships.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

73. (I) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of predaceous birds and injurious mammals. Particularly designed for those who seek employment with rodent control division of Fish and Wildlife Service.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. TRIPPENSEE.

74. (II) TECHNIQUES IN WILDLIFE MANAGEMENT.—Admission by permission of instructor. Quantitative field studies of wild animals of forest and farm. Includes cover mapping, habitat studies, census, food habits, and damage of game animals. For students interested in state and federal employment through civil service.

1 class hour; 1 4-hour laboratory period.

1:00-1:50 W.; 1:00-4:50 M.

Credit, 3.
Mr. TRIPPENSEE.

75. (I) WILDLIFE MANAGEMENT (1951-52).—Life histories, ecology, and management of the furbearers. Includes a study of natural habitats, management and fur farm problems. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. TRIPPENSEE.

84. (II) SEMINAR.—Study and discussion of problems in relation to agriculture, forestry, and the use and control of wildlife resources. For seniors majoring in wildlife management.

3 class hours.

Credit, 3.

Mr. TRIPPENSEE.

GEOLOGY AND MINERALOGY

Professor WILSON, Assistant Professor NELSON,

Mr. JOHANSSON, Mr. LIGHT.

27. (I) PHYSICAL GEOLOGY.—An introduction to the agents and processes that modify the earth's crust. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period. Credit, 3.

THE DEPARTMENT.

28. (II) HISTORICAL GEOLOGY.—A survey of geological time, stressing the development of continents and the history of plants and animals. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period. Credit, 3.

THE DEPARTMENT.

50. (I) ENGINEERING GEOLOGY.—A general course in engineering geology stressing earth structure, the dynamic processes, and agents of weathering. The laboratory work consists of mineral and rock-determination and map-reading as related to the phenomena of physical geology.

Credit, 3.

2 class hours; 1 3-hour laboratory period.

Mr. LIGHT.

51. (I) MINERALOGY.—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

52. (II) PETROLOGY.—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

54. (II) ECONOMIC GEOLOGY.—A course dealing with the origin, classification, and uses of metallic and non-metallic mineral deposits.

3 class hours.

Credit, 3.

Mr. NELSON.

61. (I) GEOMORPHOLOGY (1950-51).—A review of recent studies concerning rock structures, weathering, underground water, streams, alpine and continental glaciers, shorelines, and wind work. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. WILSON.

62. (II) GEOMORPHOLOGY (1950-51).—A review of recent studies concerning the physical geological role of organisms, coastal plains, plains and plateaus, volcanoes, dome, block, folded and complex mountains. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. WILSON.

63. (I) INVERTEBRATE PALEONTOLOGY.—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. JOHANSSON.

64. (II) PLANT PALEONTOLOGY.—A study of the history, development, and identification of plant fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. WILSON.

71. (I) 72. (II) SPECIAL PROBLEMS.—For seniors specializing in geology.

6 laboratory hours.

Hours by arrangement.

Credit, 3.
THE DEPARTMENT.

73. (I) STRUCTURAL GEOLOGY (1950-51).—A study of the origin of rock structures, their occurrence, and recognition. Field and laboratory problems emphasize the structure present in the Connecticut valley. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. LIGHT.

74. (II) PRINCIPLES OF STRATIGRAPHY (1950-51).—An examination of the principles of stratigraphic correlation and their application to the problems of the major rock units of the United States. Field and laboratory work consists primarily of problems related to the eastern United States. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. WILSON.

GERMAN

Professor JULIAN, Professor GRAHAM*, Associate Professor ELLERT,
Assistant Professor BASS,* Mr. TIBBETTS, Mr. STAWIECKI,†
Mr. THOMAS.

1. (I) 2. (II) ELEMENTARY GERMAN.—Grammar, prose composition, and reading. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours.

Credit, 3.
THE DEPARTMENT.

† On leave of absence.

* Visiting Professor.

5. (I) 6. (II) ADVANCED GERMAN PROSE.—Reading of representative German authors. Grammar review.

3 class hours.

8:00-8:50 Tu. Th. S.

Prerequisite, Entrance German.

Credit, 3.

Mr. STAWIECKI.

25. (I) 26. (II) INTERMEDIATE GERMAN.—German prose and poetry; the simple German drama; grammar review and advanced prose composition. Simpler passages of prose and poetry to commit to memory.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, German 1 and 2.

51. (I) 52. (II) NINETEENTH CENTURY LITERATURE.—A survey of German thought in the Nineteenth Century.

3 class hours.

11:00-11:50 M. W. F.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. ELLERT.

55. (I) 56. (II) "STORM AND STRESS" AND ROMANTICISM.—The "Storm and Stress" period of German literature, with study of the early plays of Goethe and Schiller. The Romantic period from Novalis to Heine, with study of poets, prose writers, critics, and philosophers.

3 class hours.

10:00-10:50. Tu. Th., 2:00-2:50 F.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. ELLERT.

57. (I) 58. (II) GOETHE'S FAUST.

3 class hours.

10:00-10:50 M. W. F.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. JULIAN.

59. (I) 60. (II) THE CLASSICAL PERIOD.—Reading and study of some important literary productions of the classical period.

3 class hours.

8:00-8:50 Tu. Th. S.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. ELLERT.

79. (I) 80. (II) CONVERSATIONAL GERMAN.—Admission only by arrangement with the head of the department. Practice in the oral use of German, based on reading material prepared in advance.

3 class hours.

3:00-4:50 Tu. Th.

Prerequisites, German 25 and 26.

Credit, 3.

THE DEPARTMENT.

81. (I) 82. (II) SCIENTIFIC GERMAN.—Only seniors admitted, except by permission of the instructor. Intensive and specialized reading of literature taken from standard German scientific journals and reference books.

3 class hours.

9:00-9:50 M. W. F.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. JULIAN.

GOVERNMENT

Associate Professor MITCHELL, Assistant Professor FERWERDA,
Mr. GOODWIN,† Mr. NEEDHAM, Mr. WALKER.

25. (I) AMERICAN GOVERNMENT.—A study of the structure and operation of our federal government. The course is based on a study of the Constitution with reference to its historical development and interpretation. Special consideration is given to changes of the twentieth century and to present-day problems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) STATE AND LOCAL GOVERNMENT.—A survey of the governmental structure and functions of the American state and its local governments, with emphasis on state-local relationships.

3 class hours.

Credit, 3.

THE DEPARTMENT.

52. (II) EUROPEAN GOVERNMENTS.—Forms and methods of the governments of Europe: historic types and theories of government, progress and problems of democracy; dictatorships and totalitarian governments. Special study of the governments of England, France, Switzerland, Italy, Germany, and Russia.

3 class hours.

Credit, 3.

Mr. FERWERDA.

61. (I) PUBLIC ADMINISTRATION.—A general survey of the field of public administration. Special emphasis will be placed on the principles of organization, the functions performed by administration, and the relation of administration to democracy.

3 class hours.

Credit, 3.

Mr. GOODWIN.

62. (II) ADMINISTRATIVE LAW.—A study of government regulatory activities in relation to industry, agriculture, and labor, with emphasis on the legal framework within which these activities operate.

3 class hours.

Credit, 3.

Mr. NEEDHAM.

63. (I) POLITICAL PARTIES AND ELECTIONS.—A study of the political process, and the nature and history of parties, pressure groups, nominations and elections.

3 class hours.

Credit, 3.

Mr. MITCHELL.

64. (II) MUNICIPAL GOVERNMENT.—A survey of the governmental structure and function of American municipalities. Special attention is given to administrative problems arising from such functions as protection, education, welfare, correction, city planning and zoning.

3 class hours.

Credit, 3.

Mr. GOODWIN.

† On leave of absence.

65. (I) CONSTITUTIONAL LAW.—An historical study of the fundamental rights and guarantees under the American Constitution as interpreted by decisions of the Supreme Court.

3 class hours.

Credit, 3.

Mr. NEEDHAM.

66. (II) AMERICAN POLITICAL THOUGHT.—A study of the development of American political thought from colonial times to the present, with emphasis upon writings of the period.

3 class hours.

Credit, 3.

Mr. MITCHELL.

67. (I) INTERNATIONAL GOVERNMENT.—A study of international organization in the twentieth century, with emphasis upon the League of Nations, the World Court, and the United Nations and its affiliated agencies.

3 class hours.

Credit, 3.

Mr. FERWERDA.

68. (II) INTERNATIONAL LAW.—A study of the origin, character, and function of international law.

3 class hours.

Credit, 3.

Mr. FERWERDA.

71. (I) ANCIENT AND MEDIEVAL POLITICAL THOUGHT.—This course traces the development of political thought from the time of the Greeks to the end of the Middle Ages and relates it to cultural and institutional growth.

3 class hours.

Credit, 3.

Mr. MITCHELL.

72. (I) MODERN POLITICAL THOUGHT.—This course traces the development of political thought from the rise of the modern state to the present time and relates it to cultural and institutional growth.

3 class hours.

Credit, 3.

Mr. MITCHELL.

93. (I) 94. (II) SEMINAR.—A study of special problems in the field of government. For seniors only.

3 class hours.

Credit, 3.

Mr. MITCHELL AND THE DEPARTMENT.

HISTORY

Professor CALDWELL, Professor CARY, Assistant Professor DAVIS,
Assistant Professor ZEENDER, Assistant Professor BOAS,
Mr. CARNES, Mr. POTASH, Mr. ASHTON

5. (I) 6. (II) MODERN EUROPEAN CIVILIZATION.—The first semester covers the period from the later Middle Ages to 1815; the second semester, the period from 1815 to the present. These courses are required for candi-

dates for the B.A. degree but may be elected independently by other students.

3 class hours.

Credit, 3.

THE DEPARTMENT.

31. (I) 32. (II) ENGLISH HISTORY.—Emphasis on economic, social, and cultural influences, as well as on constitutional development. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. CALDWELL, Mr. CARNES.

51. (I) ANCIENT HISTORY.—A general survey of Mesopotamian, Egyptian, Greek, and Roman history. Emphasis will be on political institutions, economic conditions and intellectual achievements.

3 class hours.

Credit, 3.

Mr. DAVIS.

53. (I) INTERNATIONAL RELATIONS.—A course dealing with the development and practices of international relations, the diplomatic and consular services of states, the nature of nationalism and imperialism, the basic factors determining a nation's foreign policy, and the earlier evolution toward supranational government.

3 class hours.

Credit, 3.

Mr. ASHTON.

54. (II) THE FAR EAST IN MODERN TIMES (1950-51).—This course surveys the political, cultural, and economic growth of China, Japan, and India. Emphasis is placed upon the modern phases of the internal development and upon the relations between these countries and the West. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ASHTON.

56. (II) THE HISTORY OF MODERN RUSSIA (1951-52).—This course deals with the development of Russia from 1800 to the present. Attention is given to both the internal political and economic growth and to the place of Russia in world affairs.

3 class hours.

Credit, 3.

Mr. ASHTON.

57. (I) 58. (II) HISPANIC-AMERICAN HISTORY.—A general course in the history and civilization of the Americas south of the United States. The first semester deals with the periods of exploration, organization, and revolution to 1824; the second semester, with the period of national independence and growth from 1824 to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. POTASH.

59. (I) 60. (II) HISTORY OF THE UNITED STATES.—A survey of the national development including political, social, economic, and cultural

factors in the growth of American democracy. The first semester covers the period to 1865; the second, from 1865 to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.
Mr. CARY.

65. (I) NINETEENTH AND TWENTIETH CENTURY ENGLAND (1951-52).—Victorian society and ideals; Industrial Revolution and its effects; growth of democracy; imperial development. Emphasis on social conditions and thought movements. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 32.

67. (I) TUDOR AND STUART ENGLAND (1950-51).—A brief survey of the Tudor Period followed by a detailed study of Early Stuart England. Particular emphasis is placed on social, religious, and intellectual aspects of English life in the period. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 31 or 32.

69. (I) EUROPE, 1870-1918.—Internal developments of the principal countries, including political and economic changes, social unrest, and intellectual currents; the development of imperialism; a detailed study of conditions and diplomacy which led to the World War; military history of the War.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 6.

70. (II) EUROPE SINCE 1918.—Approximately half of the course is devoted to international affairs, including the Peace Settlement, the development of German, Italian, and Japanese aggression, and World War II. The other half of the course is a study of internal developments in the principal European nations.

3 class hours.

Credit, 3.
Mr. CALDWELL.

72. (II) HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893.—Advance of settlement from the Appalachians to the Pacific and influence of the frontier upon social, economic, and political conditions in the country as a whole.

3 class hours.

Credit, 3.
Mr. DAVIS.

Prerequisite, History 59.

75. (I) MEDIEVAL EUROPE.—Europe from the barbarian invasions to the Renaissance. Social and economic conditions, development of national monarchies, the Church and religion, medieval culture.

3 class hours.

Credit, 3.
Mr. ZEENDER.

76. (II) HISTORY OF THE RENAISSANCE.—The later Middle Ages; the Church at the height of power; the rise of nationalities; the Italian towns; the New Learning and its relation to art, science, invention, geographical discoveries; spread and effects of the Renaissance.

3 class hours.

Credit, 3.
Mr. ZEENDER.

77. (I) 78. (II) THE HISTORY OF SCIENCE IN WESTERN CIVILIZATION.—This course will trace the growth of the community of science as it exists in the world today. Emphasis will be placed upon the mutual relations between science and the economic, social, and intellectual forces in society at large. History 77 is a prerequisite for History 78.

2 class hours.

Credit, 2.
Miss BOAS.

81. (I) DIPLOMATIC HISTORY OF THE UNITED STATES. 1776-1900.—The history of American foreign policy and its basic factors to the end of the nineteenth century.

3 class hours.

Credit, 3.
Mr. CARY.

Prerequisites, History 59 and 60 or permission of instructor.

82. (II) DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900.—The history of the United States as a world power.

3 class hours.

Credit, 3.
Mr. CARY.

Prerequisites, History 59 and 60 or permission of instructor.

91. (I) HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians.

1 class hour.

Credit, 1.
THE DEPARTMENT.

92. (II) SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports.

1 class hour.

Credit, 1.
THE DEPARTMENT.

HOME ECONOMICS

Professor MITCHELL, Associate Professor BRIGGS, Assistant Professor MERRIAM, Assistant Professor COOK, Assistant Professor PIATT, Assistant Professor ESCHHOLZ, Miss DAVIS, Mrs. THIES, Mrs. WILHELM.

1. (I) INTRODUCTION TO HOME ECONOMICS.—The course introduces the student to the objectives in Home Economics and the fields of specialization for which it prepares. Consideration is given to a philosophy of living which emphasizes the responsibility of a woman to her family, to her community wherever she is, and to the world. Introductory work is offered in food and nutrition, child development and family life. Labora-

tory work includes food selection and simple preparation, and observation in the Nursery School.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-9:50 Tu. Th. S. reserved for special group projects.

Mrs. PIATT.

2. (II) CLOTHING SELECTION.—A study of the principles of clothing selection in order to assist each student to choose satisfactorily line, color, and texture. Fundamentals of construction for cotton and linen.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

26. (II) TEXTILES.—A study of fiber, yarn, finish, color and design. Acquaintance with a wide variety of fabrics is afforded to develop judgment in buying and using materials for clothing and home furnishing.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss BRIGGS.

30. (II) FOOD SCIENCE AND PREPARATION.—A study of the fundamental scientific principles and comparative methods of food preparation, including home preservation. The nutritional and economic aspects of foods are also stressed.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Miss DAVIS.

31. (I) APPLIED ART.—Art principles are studied with many practical applications for selecting and arranging. Specific problems in decorating cloth, wood, and leather afford opportunity for individual expression.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss BRIGGS.

51. (I) FOOD SELECTION AND MEAL PLANNING.—Meal planning, serving and etiquette and emphasis on well-balanced meals as to nutritive value and economy of money, time, and labor in preparation. Further study of food principles and techniques of cookery.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Miss DAVIS.

Prerequisite, Home Economics 30; Chemistry 31.

52. (II) NUTRITION AND DIETETICS.—A study of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides for further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc. is given consideration.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mrs. COOK.

Prerequisites, Home Economics 30; Chemistry 31 and Zoology 1 or 35.

54. (II) NUTRITION.—For students who are not majoring in Home Economics and who do not have prerequisites for Home Economics 52. This course is designed to interpret the technical knowledge of foods and nutrition in terms of its practical application for optimum health.

2 class hours.

Credit, 2.
Mrs. Cook.

56. (II) FOOD PREPARATION AND MEAL PLANNING.—For students not majoring in home economics. This course is designed to meet the needs of those who wish a general knowledge of the basic food principles. It will include latest methods and techniques of cookery, conservation of nutrients, menu planning and food preparation, buying of food, consumer education and table service, decoration and etiquette. It is recommended for students who want a scientific as well as practical knowledge of food and its preparation for everyday use.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss DAVIS.

57. (I) CLOTHING SELECTION AND SIMPLE CONSTRUCTION.—For students not majoring in home economics. This course is designed to stimulate an interest in good workmanship. Emphasis is given to construction technique such as fitting, pattern use and altering.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mrs. WILHELM.

60. (II) HOUSEHOLD EQUIPMENT AND DEMONSTRATION TECHNIQUES.—Selection, care and operation of household equipment and the study of the mechanical principles involved. Student demonstrations given for practice with all types of equipment. Study of home lighting and wiring. Outside demonstrations and field trips are planned.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Miss MERRIAM.

61. (I) CLOTHING CONSTRUCTION.—Advanced construction and fitting problems with emphasis on new fabrics.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mrs. WILHELM.

Prerequisite, Home Economics 2 or 57 or equivalent.

62. (II) HOME FURNISHING.—A study of the fundamental principles which underlie the successful planning and furnishing of a satisfying home. A study of period homes and furnishings is included. Many applications of these principles are worked out in practical problems.

1 class hour; 2 2-hour laboratory periods.

11:00-11:50 W.; 1:00-2:50 M. F.

Credit, 3.
Miss BRIGGS.

70. (II) CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, aspects and behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in nursery work.

3 class hours; 1 1-hour laboratory period.

Credit, 3.
Mrs. THIES.

71. (I) **RETAIL FOOD BUYING.**—This course is offered jointly by the departments of olericulture, animal husbandry, and poultry husbandry for all students interested in retail marketing. First 5 weeks: vegetables and fruits, retail buying, varieties and adaptability to various uses, season of availability, grades, packs and packages. Second 5 weeks: poultry and eggs—dressed poultry is graded and prepared in various ways for the table and home freezing. Demonstrations are given of handling and market classification of eggs. Third 5 weeks: meats—demonstration and laboratory practices in identification and classification of meat cuts, in preservation (freezing and curing) and in judging quality.

2 class hours; 1 2-hour laboratory period.
8:00-8:50 Tu. Th.; 3:00-4:50 Tu.

Credit, 3.

Mr. SNYDER, Mr. VONDELL, Mr. HALE.

Mrs. ESCHHOLZ, coordinator.

75. (I) **ECONOMICS OF THE HOUSEHOLD.**—A study of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Miss MERRIAM.

77. (I) and (II) **HOME MANAGEMENT PRACTICE.**—Successive groups of seniors live in the home management house and assume responsibilities involved in managing a home. Meals are planned on low, medium, and high income levels.

Credit, 3.

Miss MERRIAM.

Prerequisites, Home Economics 51, 52, and 75, or by special permission.

80. (II) **FAMILY LIFE.**—A study of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mrs. PIATT.

81. (I) **METHODS OF TEACHING HOME ECONOMICS.**—A study of general education philosophy; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers.

3 class hours.

Credit, 3.

Mrs. PIATT.

83. (I) and (II) **STUDENT TEACHING IN HOME ECONOMICS.**—Observation and supervised teaching are carried on in the home economics classes in the nearby junior and senior high schools.

Credit, 3.

Miss MERRIAM, Mrs. PIATT.

Prerequisite, Home Economics 81 or its equivalent.

85. (I) THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.—This course is planned to give students a background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature, and science; fundamentals of play and use of play materials, and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mrs. THIES.

Prerequisite, Home Economics 70.

87. (I) PRINCIPLES AND PRACTICES OF TAILORING.—Emphasis on handling of wool in the making of suits and coats.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss BRIGGS.

Prerequisite, Home Economics 61 or equivalent.

88. (II) APPLIED DRESS DESIGN.—Costume design through draping and pattern making. An intensive study is made of texture, line, color and fit as applied to dress design and the figure.

3 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 61 or equivalent.

89. (I) DIET THERAPY.—The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease and at the same time be open-minded regarding new developments in this field. Scientific and medical terminology is emphasized.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mrs. COOK.

Prerequisites, Home Economics 52; Chemistry 79; Zoology 35.

90. (II) NUTRITION SEMINAR.—For qualified seniors. Reading and oral reports of scientific literature and preparation of bibliographies.

1 class hour.

Credit, 1.

Mrs. COOK.

91. (I) 92. (II) INSTITUTIONAL FOODS AND MANAGEMENT.—For qualified juniors or seniors interested in institutional food service. A study of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special functions of the dietitian. Laboratory work at one of the university dining halls. It is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Accounting 25 and Home Economics 71.

1 class hour; 1 5-hour laboratory period.

Credit, 3.

Mrs. ESCHHOLZ.

Prerequisites, Home Economics 51 and 52.

93. (I) EXPERIMENTAL FOODS.—The testing and comparing of different food materials and methods of preparation, including advanced work in the science and techniques of cookery. Special individual problems will be studied. The course is helpful to those interested in commercial food testing and valuable to those wishing to develop a scientific approach to the study of foods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Miss DAVIS.

Prerequisites, Home Economics 30 and permission of instructor.

95. (I) CHILD NUTRITION.—A study is made of nutritional needs from prenatal life through infancy and childhood. Methods of judging nutrition, also causes and effects of malnutrition are discussed. Menus for children and measures to insure the consumption of optimal diets are put in practice with laboratory work in the Nursery School.

3 class hours. Laboratory by arrangement.

Credit, 3.

Mrs. Cook.

Prerequisite, Home Economics 52 or 54.

98. (I) and (II) PROBLEMS IN HOME ECONOMICS.—An intensive study of some phase of home economics. By permission of the Dean of the School.

Credit, 3.

HOME ECONOMICS STAFF.

HYGIENE

HYGIENE.—All freshmen are required to attend a series of lectures on personal hygiene. For men students these lectures are included in the Military program; for women students they are scheduled as a separate course.

Credit, 1.

THE HEALTH SERVICE STAFF.

JOURNALISM

Professor MUSGRAVE.

85. (I) INTRODUCTION TO JOURNALISM.—A basic course in reporting designed to acquaint the student with the scope, principles, and practice of contemporary journalism. Stress is placed upon the role of the press as a social institution and upon the relationships between a general education and effective journalism.

3 class hours.

Credit, 3.

Mr. MUSGRAVE.

86. (II) FEATURE ARTICLE WRITING.—Instruction in writing feature or magazine articles, combined with some of the material of a course in advanced reporting. The practice work is related to problems of interpretative writing, communication, and public opinion. Each student is expected to publish a feature article in a newspaper or magazine.

3 class hours.

Credit, 3.

Mr. MUSGRAVE.

Prerequisite, Journalism 85 or permission of the instructor.

LANDSCAPE ARCHITECTURE

Professor OTTO, Professor BLUNDELL, Assistant Professor ROBERTSON,
Mr. PROCOPIO, Mr. MACIVER, Mr. HAMILTON.

Landscape Architecture

25. (I) FREEHAND DRAWING AND ELEMENTARY DESIGN.—For majors in landscape architecture. The work in this course is to supply the student with technical aspects of freehand drawing and design necessary to proficiency in that field.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

26. (II) LANDSCAPE DRAFTING.—This course continues the work in Landscape Architecture 25, but draws on the mechanical aspects of the designers problems and includes simple projections—orthographic, perspective, and isometric—and architectural shades and shadows.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

51. (I) ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.—Contour interpolation, grading and drainage plans, drive design, profiles and sections, computation of earth work. Application of surveying to landscape construction.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. PROCOPIO.

Prerequisites, Civil Engineering 27; Landscape Architecture 26.

52. (II) CONSTRUCTION DETAILS.—A series of problems in architectural garden features as walks, steps, walls, gates, pools, and small structures.

2 3 hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. PROCOPIO.

Prerequisite, Landscape Architecture 51.

53. (I) GARDEN DESIGN.—Fundamental principles of composition with application to problems in the design of gardens and small home grounds.

3 2-hour laboratory periods.
3:00-4:50 M. W. F.

Credit, 3.
Mr. OTTO.

Prerequisites, Landscape Architecture 25 and 26 or permission of the instructor.

54. (II) GENERAL DESIGN.—A series of problems in the design of small properties, estates and parks. Members of this class will be required to take a two-day field trip to visit typical examples of design; approximate cost, \$8.00.

3 2-hour laboratory periods.
3:00-4:50 M. W. F.

Credit, 3.
Mr. OTTO.

Prerequisites, Landscape Architecture 51, 53, and concurrently 52.

76. (II) CIVIC ART.—A survey of the principles and applications of modern civic art, including city planning, regional planning and the design of various types of land areas.

3 2-hour laboratory periods.

Credit, 3.
Mr. OTTO.

Prerequisites, Landscape Architecture 51 and 52.

79. (I) CONSTRUCTION AND MAINTENANCE (1951-52).—A study of construction methods and the maintenance of estate, park, and recreation areas. Given in alternate years.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. PROCOPIO.

80. (II) HISTORY AND LITERATURE OF LANDSCAPE ARCHITECTURE.—A review of the significant history and literature of landscape architecture and the allied fields of city planning, regional planning and highway improvement. Compilation of bibliographies on various phases of these fields.

2 class hours.

8:00-8:50 Tu. Th.

Credit, 2.
Mr. HAMILTON.

81. (I) 82. (II) ADVANCED DESIGN.—Class B Exchange Problems plus specialized study of landscape details and a summary of general design. Members of the class may be required to take a two-day field trip to visit typical examples of design; approximate cost, \$10.00.

3 2-hour laboratory periods.

3:00-4:50 M. W. F.

Credit, 3.
Mr. HAMILTON.

Prerequisites, Landscape Architecture 53 and 54.

83. (I)) ARCHITECTURE (1950-51).—The history of architectural development, including styles of architecture and construction principles of value to the landscape architects when working with architectural problems. Given in alternate years.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.
Mr. ROBERTSON.

84. (II) SKETCHING.—Drawing and sketching in various mediums from outdoor and indoor subjects.

2 2-hour laboratory periods.

1:00-2:50 M. F.

Credit, 2.
Mr. ROBERTSON.

Horticulture

1. (I) PLANT PROPAGATION.—This course serves as an introduction to the field of horticulture, emphasizing the methods and principles involved in the propagation of horticultural plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. THAYER, Mr. PROCOPIO.

26. (II) PLANT MATERIALS.—Detailed study of deciduous and evergreen trees, with special reference to their mature form and character,

means of identification, natural associations, and uses of the various types of trees in landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

51. (I) PLANT MATERIALS.—Detailed study of shrubs and woody vines, and their identification, with especial emphasis being given to their adaptability to the various landscape uses, methods of handling, and care.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

52. (II) PLANTING DESIGN.—A study of the utilization of plant materials in combination as applied to the many conditions and demands of landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

Prerequisites, Horticulture 26 and 51.

LATIN

51. (I) 52. (II) LATIN.—A course in elementary Latin. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours.

Credit, 3.

Mr. _____.

55. (I) 56. (II) LATIN.—A college survey of classical Latin literature: epic (Virgil), lyric (Catullus and Horace), comedy (Plautus), oratory (Cicero), and philosophy (Lucretius). The list may be varied according to the needs of particular classes.

3 class hours.

Credit, 3.

Mr. _____.

Prerequisites, Latin 51, 52 or 2 years of high school Latin.

MATHEMATICS

Professor ANDERSEN, Professor MACHMER, Professor WAGNER, Associate Professor BOUTELLE, Assistant Professor SCHOONMAKER, Assistant Professor ROSE, Assistant Professor CULLEN, Mr. BUZZELL, Mr. SKILLINGS, Mr. RITGER†, Mr. ALLEN, Mr. MIENTKA, Mr. MOSER, Mr. HALPERN.

5. (I) INTRODUCTORY ENGINEERING MATHEMATICS.—Trigonometry and algebra: a rapid basic review, theory of equations, simple determinants and the slide rule. Plane analytic geometry: the straight line, conic sections, selected higher plane curves, polar coordinates and parametric equations.

4 class hours.

Credit, 4.

THE DEPARTMENT.

6. (II) INTRODUCTORY CALCULUS FOR ENGINEERS.—Differentiation, with applications, technique of integration.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 5.

† On leave of absence.

7. (I) ALGEBRA AND TRIGONOMETRY.—For all freshmen, except majors in Engineering, who are required to take a full year of college mathematics. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry.

Credit, 3.

3 class hours.

THE DEPARTMENT.

8. (II) ALGEBRA.—This course is designed for the freshmen who do not plan to proceed to Calculus. Theory of equations, progressions, mensuration, number systems, and the elements of statistics and mathematics of investments.

Credit, 3.

3 class hours.

THE DEPARTMENT.

10. (II) ALGEBRA AND ANALYTIC GEOMETRY.—This course is designed for the freshmen who plan to take Calculus. Theory of equations, binominal theorem, determinants of higher order, and plane analytic geometry.

Credit, 3.

3 class hours.

THE DEPARTMENT.

Prerequisite, Mathematics 7.

12. (II) FUNCTIONAL MATHEMATICS.—For freshmen who are not required to take a full year of college mathematics. Fractions, percentage, linear and quadratic equations with applications, exponents, logarithms, slide rule, proportion, graphs, statistics, progressions, and the elements of mathematics of investments.

Credit, 3.

3 class hours.

Mr. SCHOONMAKER, Mr. ALLEN.

29. (I) DIFFERENTIAL CALCULUS.—The basic ideas and methods of the differential calculus.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10 or 27.

30. (II) INTEGRAL CALCULUS.—A continuation of Mathematics 29 into the field of the integral calculus, with special emphasis on application to problems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 29.

31. (I) APPLIED CALCULUS FOR ENGINEERS.—Area, volume, length of curve, centroid, moment of inertia, liquid pressure, work, partial differentiation.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 6.

32. (II) APPLIED CALCULUS FOR ENGINEERS.—Multiple integrals, infinite series, expansion of functions, hyperbolic functions, differential equations, elements of vector analysis.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 31.

51. (I) MODERN SYNTHETIC GEOMETRY.—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers.

3 class hours.

Credit, 3.

Mr. ANDERSEN.

Prerequisite, Mathematics 30.

55. (I) MATHEMATICS OF FINANCE.—The mathematical principles of simple and compound interest, annuities, depreciation, valuation of bonds, insurance. The development and application of aids to computation in problems arising from financial transactions.

3 class hours.

Credit, 3.

10:00-10:50 Tu. S.; 11:00-11:50 Th.

Mr. BOUTELLE.

Prerequisite, Mathematics 7.

60. (II) SPHERICAL TRIGONOMETRY AND SOLID ANALYTIC GEOMETRY (1951-52).—The trigonometry of the sphere with application to terrestrial and celestial problems. This is followed by a study of higher plane curves and the analytic representation of points, lines, and surfaces in space. Given in alternate years.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 30.

62. (II) STATISTICS.—The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability curve, probable error, sampling, reliability.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 10 or 27.

65. (I) THEORY OF EQUATIONS (1951-52).—An introduction to advanced algebra. A discussion of the conditions for and methods of solving algebraic and transcendental equations; ruler and compass constructions; systems of equations; determinants and matrices; symmetric functions; resultants; discriminants; invariants; the fundamental theorem of algebra. Given in alternate years.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 10 or 27.

66. (II) INTRODUCTION TO HIGHER GEOMETRY (1951-52).—A study of various methods employed in the modern treatment of the geometry

of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometrics, will be considered. Given in alternate years.

3 class hours.

Credit, 3.

MR. ANDERSEN.

Prerequisite, Mathematics 10 or 27.

71. (I) VECTOR ANALYSIS (1950-51).—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years.

3 class hours.

Credit, 3.

MR. ANDERSEN.

Prerequisites, Mathematics 30; Physics 26.

72. (II) HISTORY OF MATHEMATICS (1950-51).—A study of mathematics as it has developed historically. Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years.

3 class hours.

Credit, 3.

MR. ROSE.

Prerequisite, Mathematics 30.

91. (I) INTERMEDIATE CALCULUS.—Series, expansion of functions, partial differentiation, envelopes, and multiple integrals.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

92. (II) DIFFERENTIAL EQUATIONS.—

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

94. (II) ADVANCED CALCULUS.—A continuation of Mathematics 91. Line and surface integrals; Taylor's expansion; Fourier series; calculus of variations; Elliptic, Gamma, and Beta functions; continuity theorems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 91.

Astronomy and Meteorology

57. (I) METEOROLOGY.—A consideration of weather elements, air masses, frontal structures and storms, the construction and interpretation of weather maps and the general principles of weather forecasting.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

MR. LANPHEAR.

58. (II) ASTRONOMY.—The course deals with a consideration of the atmosphere through which astronomical phenomena are observed; fundamental conceptions of the celestial sphere, the solar system, stars, galaxies. The chief objective is to make the student alive to the beauty and order revealed in the sky.

2 class hours.

8:00-8:50 Tu. Th.

Credit, 2.

Mr. LANPHEAR.

MILITARY

Colonel TODD, PMS&T, Lieutenant Colonel DEHORN, PAS&T, Lieutenant Colonel ADAMS, Assistant PMS&T, Major HALE, Assistant PAS&T, Major PRATT, Assistant PAS&T, Major BARRETT, Assistant PAS&T, Captain SEARLE, Assistant PAS&T, Captain WILLOUGHBY, Assistant PMS&T.

1. (I) 2. (II) Theoretical and practical instruction in leadership, drill and exercise of command, individual weapons and marksmanship, hygiene and first aid, maps and aerial photographs, military organization, and the National Defense Act, ROTC regulations.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit 2.

ARMY AND AIR FORCE INSTRUCTORS.

25. (I) 26. (II) Theoretical and practical instruction in leadership, drill and exercise of command, physical development methods, maps, and aerial photographs, military administration, evolution of warfare, military law and boards.

3 scheduled hours.

Credit, 2.

ARMY AND AIR FORCE INSTRUCTORS.

51. (I) 52. (II) Theoretical and practical instruction in leadership, drill and exercise of command, military leadership, psychology and personnel management, Geographical foundation of national power, and military law and boards; tactics and technique of cavalry or armored units for students in the armored cavalry unit; tactics and techniques of the Army Air Forces for students in the air force unit.

5 scheduled hours.

Credit, 3.

ARMY AND AIR FORCE INSTRUCTORS.

75. (I) 76. (II) Theoretical and practical instruction in leadership, drill and exercise of command, military teaching methods, military problems of the United States, psychological warfare, military mobilization and demobilization, command and staff operations; tactics and technique of cavalry or armored units for students in the armored cavalry unit; tactics and techniques of the Army Air Forces for students in the air force unit.

5 scheduled hours.

Credit, 3.

ARMY AND AIR FORCE INSTRUCTORS.

OLERICULTURE

Professor SNYDER, Assistant Professor TUTTLE, Mr. JOHNSON.

25. (I) GENERAL OLERICULTURE.—A study of the factors affecting the growth of plants which are essential to a basic understanding of the cultural requirements of vegetable and other horticultural crops.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SNYDER, Mr. JOHNSON.

51. (I) PLANT NUTRITION.—A critical study of the water and nutrient requirement of vegetable plants as applied to irrigation, soils and their preparation, manures, fertilizers, lime, green manures and crop residues.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. TUTTLE.

52. (II) PLANT CULTURE.—A study of certain environmental factors which influence the culture of vegetables as applied to actual commercial practices.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. JOHNSON.

73. (I) VEGETABLE MARKETING PRACTICES.—A consideration of the various factors, techniques, and methods in harvesting and preparing vegetables for market, including marketing centers, production areas, market and consumer preference, packing house facilities equipment, and premarket storage. Trips to nearby growers and markets will be required at a cost of not over ten dollars.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

Prerequisite, Agricultural Economics 55.

74. (II) MERCHANDISING OF PERISHABLES.—Discussion and demonstrations in this course will include the various techniques, practices, and methods that are used in selling and distributing horticultural commodities through both wholesale and retail outlets from the farm to the ultimate consumer. Trips to the Boston and New York markets may be elected by the student at a reasonable cost.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

75. (I) SYSTEMATIC OLERICULTURE.—A detailed study of variety identification; nomenclature and classification; history, variety improvement and seed sources; judging and exhibiting.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Hours by arrangement.

Mr. SNYDER.

76. (II) GREENHOUSE CROPS AND PLANT GROWING (1950-51).—A study of the culture of greenhouse crops including cucumbers, tomatoes, lettuce, rhubarb, and mushrooms; the growing of seeding plants both under glass and in the open for local retail or wholesale business.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. JOHNSON.

78. (II) COMMERCIAL OLERICULTURE.—A study of the problems in the commercial production of vegetables: general culture, fertilizers and manures, machinery, labor, harvesting, and marketing. One or two trips to important markets and truck growing sections are required. Twenty-five dollars will cover the cost of these trips.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. TUTTLE.

81. (I) 82. (II) SEMINAR.—Advanced study of problems relating to vegetable production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

PHILOSOPHY.

Professor GLICK, Assistant Professor SHUTE.

61. (I) INTRODUCTION TO PHILOSOPHY.—A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas.

3 class hours.

Credit, 3.

8:00-8:50 or 11:00-11:50 M. W. F.

Mr. GLICK.

62. (II) HISTORY OF PHILOSOPHY.—A survey of the development of western thought from the early Greeks to the present.

3 class hours.

Credit, 3.

8:00-8:50 or 11:00-11:50 M. W. F.

Mr. GLICK.

63. (I) LOGIC.—A study of the principles, problems and methods of critical thinking; emphasis upon principles and methods of formal logic; critical study of inductive reasoning and scientific method with applications to current problems.

3 class hours.

Credit, 3.

Mr. GLICK.

64. (II) ETHICS.—The meaning of good and evil, right and wrong; survey of ethical theories and practices both historical and contemporary; an attempt to evaluate these theories with reference to modern ethical problems.

3 class hours.

Credit, 3.

Mr. GLICK.

81. (I) PHILOSOPHY OF RELIGION.—A critical and constructive study of the origin and nature of religion; its various forms; its function in human life; its place as a cultural phenomenon.

3 class hours.

Credit, 3.

Mr. SHUTE.

82. (II) AESTHETICS.—The meaning of aesthetic experience; the objective and subjective character of beauty; the origin and nature of the art impulse; the place of art in culture and personality; the principles of criticism.

3 class hours.

Credit, 3.

Mr. SHUTE.

83. (I) READING IN ANCIENT PHILOSOPHY.—Special attention is given to the works of Plato and Aristotle.
3 class hours.

Credit, 3.
Mr. SHUTE.

84. (II) READINGS IN MODERN PHILOSOPHY.—Attention is focused on the writings of Kant, with a discussion of the background of his development and his influence on modern thought.
3 class hours.

Credit, 3.
Mr. SHUTE.

PHYSICAL EDUCATION FOR MEN.

Professor McGUIRK, Professor GORE, Professor RADCLIFFE, Professor ECK, Professor LORDE, Associate Professor KAUFFMAN, Assistant Professor DERBY, Assistant Professor BRIGGS, Assistant Professor ROGERS, Mr. BALL, Mr. SALWAK, Mr. KOSAKOWSKI, Mr. MASI, Mr. RICCI.

3. (I) 4. (II) PHYSICAL FITNESS ACTIVITY COURSE.—The object of the course is to help every student, through regularity and continuity of physical activity, to realize not only his physical and mental capacities, but learn to use them as an intelligent, cooperative, and efficient citizen. The students are given physical fitness ratings, must meet minimum standards in the basic skills in team sports and rugged exercise, as well as learn to swim.

3 class hours.

Credit, 1.
THE DEPARTMENT.

5. (I) PHYSICAL EDUCATION SURVEY.—A survey of the health, physical education, and physical recreation courses which make up the physical education major. This course provides an introduction to the broad field of physical education.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. GORE, Mr. ROGERS, Mr. SALWAK and the DEPARTMENT.

33. (I) 34. (II) PHYSICAL EDUCATION.—A physical fitness activity program.

3 hours.

Credit, 1.
THE DEPARTMENT.

63. (I) 64. (II) PHYSICAL EDUCATION.—A physical fitness activity program. This course continues with the rugged physical fitness activity with additional emphasis upon the so-called carry-over-value and recreational sports.

3 hours.

Credit, 1.
THE DEPARTMENT.

83. (I) 84. (II) PHYSICAL EDUCATION.—A physical fitness activity program. This course continues with the rugged physical fitness activity with additional emphasis upon the so-called carry-over-value and recreational sports.

3 hours.

Credit, 1.
THE DEPARTMENT.

22. (II) FIRST AID INSTRUCTOR COURSE.—This course includes training in the standard, advanced, and instructor First Aid courses. Successful completion results in certification as American National Red Cross First Aid instructor. Some work is given in athletic training techniques.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.

Mr. GORE.

41. (I) WINTER ACTIVITIES.—Winter ice and snow activities programs, including skiing, skating, conduct of winter carnivals, winter sports safety; and the design, construction, and maintenance of winter sports facilities.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

9:00-9:50 Th.; laboratory hours by arrangement.

Mr. GORE, Mr. BRIGGS.

42. (II) WATER SAFETY INSTRUCTOR COURSE.—This course includes training in senior lifesaving and the instructor Water Safety course. Successful completion results in certification as American National Red Cross Water Safety instructor. Some work is given in competitive swimming, diving, canoeing, boating and recreational swimming.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

12:00-12:50 Tu.; 1:00-2:50 Tu. Th.

Mr. GORE, Mr. ROGERS.

43. (I) OFFICIATING.—Technique and practice in officiating major sports.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

11:00-11:50 F.; laboratory hours by arrangement.

Mr. BALL.

44. (II) TESTS AND MEASUREMENTS.—This course considers the status of measurement in physical education, an historical sketch, typical contributions in anthropometrics, strength tests, ability and achievement tests, cardiac functional tests, neuro-muscular control tests, and sport technique tests; and it includes the tools of measurement, indices, and the theory and practice of test administration.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. SALWAK.

45. (I) HISTORY AND PURPOSES OF PHYSICAL EDUCATION.—A brief study of the history of the development of the various systems of physical education and a study of the aims and ideals of present-day physical education.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

Mr. LORDEN.

51. (I) INTRODUCTORY COURSE FOR TEACHER-COACHES.—This course outlines the coaching of soccer, basketball, and hockey.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W.

Mr. BRIGGS, Mr. BALL, Mr. FITZGERALD.

52. (II) INTRODUCTORY COURSE FOR TEACHER-COACHES.—Continuation of Course 51. This course outlines the coaching of football, baseball, and track and field.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 W.

Mr. ECK, Mr. LORDEN, Mr. MASI, Mr. DERBY.

53. (I) PHYSICAL EDUCATION—ELEMENTARY SCHOOLS.—This course includes the objectives, organization, significance, and content of physical education in the grade schools. The course is correlated with the requirements of the State Department of Education.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 Tu. Th.; 1:00-2:50 M. Mr. DERBY.

54. (II) PHYSICAL EDUCATION—SPECIAL METHODS.—This course includes the objectives, significance, organization and content of physical education in junior and senior high school. The course is correlated with the requirements of the State Department of Education.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 Tu. Th.; 1:00-2:50 M. Mr. DEBRY.

55. (I) ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Problems and procedures in physical education, organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas.

3 class hours. Credit, 3.
12:00-12:50 M. W. F. Mr. McGUIRK.

57. (I) CAMP COUNSELOR TRAINING COURSE.—This course covers details of camping techniques from the three-fold angle of organized camp counselor, i.e., as a child counselor, as a general activities counselor, and as a specialty counselor.

3 class hours. Credit, 3.
8:00-8:50 M. W. F. Mr. GORE.

58. (II) ORGANIZED CAMPING ADMINISTRATION.—This course includes the history of organized camping, minimum standards of health and safety, the development of camping philosophies, trends, and the camping industry.

3 class hours. Credit, 3.
8:00-8:50 M. W. F. Mr. GORE.

59. (I) SCOUTING ELEMENTS AND PRINCIPLES.—A course in the elements and principles of scouting, given in cooperation with the Scout Executive, Hampshire-Franklin Council, Boy Scouts of America.

1 class hour; 1 2-hour laboratory period. Credit, 2.
Hours by arrangement. Mr. GORE.

71. (I) 72. (II) SPECIAL PROBLEMS COURSES.—Presentation and discussion of research work in physical education, physical recreation, health and safety education, or athletics.

3 class hours. Credit, 3.
Hours by arrangement. Mr. GORE and the DEPARTMENT.

73. (I) RECREATION—ADMINISTRATION AND ORGANIZATION.—Administration and organization of recreational areas, including playground layouts, equipment supplies, maintenance, leadership, training activities, conduct of programs, and problems of operations.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. GORE.

74. (II) RECREATION—RECREATION LAND USE.—Including types of recreational areas, recreational resources, recreational needs of the people, geography of recreation, competitors of recreational land use, economic aspects of federal, state, and local recreational systems.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. GORE.

76. (II) ANATOMY GENERAL.—A course in structural human anatomy.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. RADCLIFFE.

78. (II) ANATOMY APPLIED—KINESIOLOGY.—A course aimed to give the anatomical application basal to a thorough understanding of the mechanical problems in apparatus, athletic, and corrective exercises.

3 class hours.

10:00-10:50 M. W. F.

Prerequisite, Physical Education 76.

Credit, 3.
Mr. KAUFFMAN.

86. (II) SAFETY EDUCATION.—This course includes safety education, driver education and driver training at the instructor's level. Successful completion results in certification as American National Red Cross Accident Prevention instructor and Massachusetts Registry of Motor Vehicles instructor in Driver Education and Driver Training. The course is designed primarily for seniors majoring in physical education and for elementary and secondary school teachers.

2 class hours.

12:00-12:50 M. W.

Credit, 2.
Mr. GORE, Mr. MASI.

PHYSICAL EDUCATION FOR WOMEN

Associate Professor TOTMAN, Miss HUBBARD, Mrs. HARMON,
Miss HIRSCHHAUT.

7. (I) 8. (II) PHYSICAL EDUCATION.—Students are required to participate in one term of dancing, in one team sport, and to pass a safety test in swimming. Except for these requirements, all unrestricted students may select any activity which is offered. Fall season: field hockey, volleyball, soccer, archery, tennis, swimming. Winter season: basketball, volleyball, badminton, swimming, life saving (by permission), modern dance, square dance, calisthenics, posture training. Spring season: softball, soccer, archery, swimming, modern dance.

3 class hours.

Credit, 2.
THE DEPARTMENT.

27. (I) 28. (II) PHYSICAL EDUCATION.—The activities offered in Courses 7 and 8 are continued. In addition, advanced modern dance is offered in the fall season and water safety instruction in the winter season. Unrestricted students may select any activity which is offered.

3 class hours.

Credit, 2.

THE DEPARTMENT.

61. (I) 62. (II) PHYSICAL EDUCATION.—Participation in the activity classes for freshmen and sophomores, with the purpose of gaining further skill and developing physical fitness.

3 class hours.

Credit, 1.

THE DEPARTMENT.

81. (I) 82. (II) PHYSICAL EDUCATION.—Participation in activity courses for physical fitness with opportunity to learn refereeing in sports and to assist in teaching individual sports.

3 class hours.

Credit, 1.

THE DEPARTMENT.

PHYSICS

Professor POWERS, Associate Professor ALDERMAN, Associate Professor ROSS, Assistant Professor BURPO,* Assistant Professor WANNLUND, Assistant Professor MATHIESON, Mr. CROOKER.

25. (I) MECHANICS, SOUND, AND HEAT.—This course is largely a study of the following and related topics; equilibrium of bodies; forms of energy and work; motion, fluids; surface tension; molecular phenomena; elasticity; wave-motion; sound; thermometry expansion; hygrometry; transmission of heat; changes of state; radiation.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 8 or its equivalent.

26. (II) LIGHT AND ELECTRICITY.—Includes wave-theory of light; optical instruments; analysis of light; interference; polarization; magnetism; electrostatics; production and properties of electric currents; electrical appliances and machines; oscillatory circuits; vacuum tubes, and related topics.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Physics 25.

51. (I) 52. (II) MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS.—Course 51 deals largely with direct currents; Course 52 with alternating currents, applications of thermionics, and photo-electricity. These courses are planned to give the student a good training in theory and methods of measurement in the indicated

* On leave of absence for military service.

subjects, which are useful in many fields of investigation. Modern methods are stressed and instruments of precision are used.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu., Th.; 10:00-11:50 Tu. or 1:00-2:50 Tu. or W.

Mr. POWERS.

Prerequisites, Physics 26 and Mathematics 29 for Course 51; Physics 51 for Course 52.

55. (I) 56. (II) MECHANICS.—Development of the fundamental concepts of dynamics with applications to particles and rigid bodies in translation and rotation. One laboratory period may be substituted for one class hour.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.; laboratory by arrangement.

Mr. ROSS.

Prerequisites, Physics 26; Mathematics 30.

58. (II) PHOTOGRAPHY.—Class work and laboratory practice in the fundamentals of photography. Types of cameras, characteristics of photographic emulsions, exposure and exposure meters, processing of negative and prints, enlarging, composition. Limited to ten students.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

3:00-3:50 W.; 1:00-3:50 M. F.

Mr. POWERS.

Prerequisites, Physics 25, 26; Chemistry 1, 2.

60. (II) SOUND AND ACOUSTICS.—A study of vibrations, vibrating bodies, coupled systems, sound structure, and acoustic properties. The work will include many applications of sound to technical and commercial fields.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

Prerequisite, Physics 55 or its equivalent.

61. (I) 62. HEAT AND THERMODYNAMICS.—A study of heat exchanges and energy changes due to heat in systems of matter. The subject material and experimental methods are useful in other branches of science.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; 2:00-3:50 Th.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

63. (I) 64. (II) OPTICS.—An intermediate course in the theory of light. Work in geometrical and physical optics is done. Precision instruments are used in the laboratory.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; laboratory hours by arrangement.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

75. (I) 76. (II) ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.—These courses are largely experimental and the subject matter is adapted to the needs of the individual student. The research viewpoint

is emphasized. The class hour is used for a course in precision of measurements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WANNLUND.

Prerequisites, Mathematics 29, 30; two of the following year courses: Physics 51-52, 55-56, 61-62, 63-64.

85. (I) 86. (II) MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. Ross.

Prerequisites, Physics 51, 52, 62 and 64 or equivalent; Mathematics 29, 30.

95. (I) 96. (II) ELECTRONICS.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. POWERS, Mr. WANNLUND.

Prerequisites, Physics 51, 52; Mathematics 29, 30.

POMOLOGY

Professor FRENCH, Associate Professor ROBERTS, Assistant Professor O. G. ANDERSON, Mr. J. F. ANDERSON.

26. (II) SMALL FRUITS.—A study of the growing of raspberries, blackberries, strawberries, currants, blueberries, cranberries, and grapes, dealing with such questions as varieties, selecting a site for the plantation, soils, fertilizers, pruning, harvesting, and marketing.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W.

Mr. O. ANDERSON.

53. (I) GENERAL POMOLOGY.—A study of the most improved practices in tree fruit production, including orchard sites and soils, laying out and setting the orchard, the structure and growth of fruit plants; the bearing habits, pruning, fertilizers, pollination; pest control; harvesting and marketing the crop.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; 3:00-4:50 F.

Mr. ROBERTS, Mr. J. ANDERSON.

56. (II) SPRAYING.—This course is especially designed to familiarize the student with details of pest control in the orchard. It involves a study of (a) spraying and dusting machinery; (b) methods in the application of materials used in orchards, with the important considerations for spraying each fruit and for combating each orchard pest; (c) preparation for use of the common fungicides and insecticides.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 1:00-2:50 Tu.

Mr. ROBERTS.

57. (I) FRUIT JUDGING.—Practice in the identification, selection, and judging of fruit for exhibition purposes. From this class a team is selected to represent the University in Intercollegiate Fruit Judging Contests.

1 class hour.

Credit, 1.

Hours by arrangement.

Mr. O. ANDERSON.

75. (I) SYSTEMATIC POMOLOGY (1952-53).—A study of the more important kinds and varieties of fruits grown in the United States, their relationships and nomenclature. Particular emphasis is placed upon the identification, classification and value of varieties including a study of the characters of the plant as well as the fruit. Given in alternate years.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.

9:00-9:50 Tu.; 1:00-2:50 M. W. F.

Mr. O. ANDERSON.

7. (I) COMMERCIAL POMOLOGY (1951-52).—A critical consideration of the picking, grading, packing, storing, and marketing of fruits. This course also considers the leading American and foreign centers of fruit production as they affect our own fruit industry through competition here or abroad. A two-day market trip will be required at an approximate cost of ten dollars. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 W.

Mr. ROBERTS, Mr. J. ANDERSON.

81. (I) 82. (II) ADVANCED POMOLOGY.—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants. Special attention is given to the more important research work in the field of pomology.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. FRENCH.

Prerequisite, Pomology 53.

83. (I) 84. (II) SEMINAR.—Advanced study of problems relating to fruit production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

85. (I) 86. (II) CRANBERRY PROBLEMS.—For seniors specializing in cranberry technology. Selected readings and individual work to familiarize students with the literature, research, and problems of the cranberry industry.

Credit, 2.

Hours by arrangement.

Mr. FRENCH.

Plant Breeding

52. (II) PLANT BREEDING METHODS.—An advanced study of genetic topics peculiar to plants, also the methods and problems of the plant breeder. Laboratory work in genetic analysis and the breeding of plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. W.; 10:00-11:50 F.

Mr. FRENCH.

Prerequisite, Zoology 53.

81. (I) 82. (II) SPECIAL PROBLEMS IN PLANT BREEDING.—Qualified seniors may carry on advanced study on special topics or undertake such original investigations as time and available material will permit.

Hours by arrangement.

Credit, 2.

Mr. FRENCH.

Prerequisite, Plant Breeding 52.

POULTRY HUSBANDRY

Professor JEFFREY, Professor SANCTUARY, Assistant Professor BANTA,
Assistant Professor VONDELL.

35. (I) GENERAL POULTRY.—For students not majoring in poultry husbandry. A general course giving an introduction to the breeds of poultry, the principles and practice of breeding, incubation, and poultry nutrition, brooding and rearing, houses and equipment, management practices, marketing poultry products, and the business of poultry keeping.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 10:00-11:50 or 1:00-2:50 or 3:00-4:50 Tu.

Mr. JEFFREY.

52. (II) INCUBATION AND BROODING.—This course is based upon the actual operation of incubators and brooders. Each year a research project is planned and data obtained concerning the effects of various incubator adjustments upon malpositions and maldevelopment of embryos and the percentage of hatch. Studies of temperature gradients, chick behavior and development are made in brooding with various types of equipment. Analysis is made of common and unusual field problems.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Tu.; 3:00-4:50 Th.; other hours by arrangement.

Mr. SANCTUARY.

53. (I) POULTRY JUDGING.—Physiological and anatomical characters are used in production judging. The American Standard of Perfection is employed in a study of the more popular breeds and varieties, and for exhibition judging. Judging teams competing in the Eastern Intercollegiate Contest are trained in this course.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Tu.; 1:00-2:50 W. F.

Mr. BANTA.

55. (I) POULTRY HOUSING AND SANITATION.—In this course are considered the biological factors related to the proper physical environment necessary for growth, health, and reproduction. Various systems of ventilation and methods of insulation are studied and demonstrated by models. Humidity, temperature, and condensation studies are made at the poultry plant with varying adjustments of ventilation devices. A study is made of modern equipment. Sanitation from the standpoint of disease prevention practices is also considered.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

11:00-11:50 Tu.; 3:00-4:50 Th.

Mr. SANCTUARY.

56. (II) **POULTRY NUTRITION.**—A study of the scientific principles of nutrition, classification and identification of feedstuffs, formulation and calculation of rations for specific purposes. A class trip may be arranged. 2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th.; 1:00-2:50 W. Mr. BANTA.

75. (I) **MARKETING POULTRY PRODUCTS.**—A study of the preparation and grading methods of eggs and poultry products to meet the requirements of the northeastern markets. The laboratories are designed to cover the fields of modern dressing, processing and packaging of poultry; as well as grading, candling and quality studies of eggs. A one-half day class trip to Springfield markets in December is required. Estimated cost, two dollars.

1 class hour; 1 2-hour laboratory period. Credit, 2.
10:00-10:50 Tu.; 3:00-4:50 W. Mr. VONDELL.

76. (II) **TURKEY PRODUCTION.**—This course includes the production of ducks and geese but most of the time is given to the turkey industry; its importance, breeds, breeding, incubation, brooding, feeding, finishing, marketing, etc.

1 class hour; 1 2-hour laboratory period. Credit, 2.
1:00-1:50 M.; 1:00-2:50 W. Mr. VONDELL.

77. (I) **POULTRY BREEDING.**—The improvement of poultry by selection is developed through a study of the principles of heredity. The inheritance of morphological and physiological characters including plumage color, egg production, meat production, hatchability, egg traits, and disease resistance.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. W.; 3:00-4:50 F. Mr. JEFFREY.
Prerequisite, Zoology 1, 53.

78. (II) **SEMINAR AND FARM MANAGEMENT.**—A combination seminar and lecture course designed to give the student a comprehensive view of all phases of the poultry industry. A field trip covering approximately three days will be arranged. Students may elect an additional problem credit.

3 class hours; 1 2-hour laboratory period may be elected. Credits, 3, 4.
11:00-11:50 M. W. F. Mr. JEFFREY.

PSYCHOLOGY

Professor NEET, Assistant Professor FELDMAN, Assistant Professor Goss, Assistant Professor VALLANCE, Mr. KRASNER, Mr. RONAN, Mr. ———, Dr. MICHELSON.

26. (I) and (II) **GENERAL PSYCHOLOGY.**—This is an introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Topics considered include the nature and development of behavior, motivation, learning, problems of adjustment, intelligence, aptitudes, and personality. 3 class hours.

Credit, 3.
THE DEPARTMENT.

28. (II) GENERAL PSYCHOLOGY.—A continuation of Psychology 26. Topics considered include neural relationships, sensory processes, perception, thinking, emotions, social behavior, and individual differences.

3 class hours.

11:00-11:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.

THE DEPARTMENT.

51. (I) EXPERIMENTAL PSYCHOLOGY.—This course is designed to give an understanding of the problems, methods, and data of experimental psychology. One of the basic functions of the course is to acquaint the student with the scientific method as applied to experimental studies of behavior.

2 class hours; 1 2-hour laboratory period.

10:00-10:50 Tu. Th.; 1:00-2:50 Tu. W. or Th.

Prerequisite, Psychology 26.

Credit, 3.

Mr. NEET.

56. (II) EDUCATIONAL PSYCHOLOGY.—A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are: physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil.

3 class hours.

9:00-9:50 Tu. Th. S.

Prerequisite, Psychology 26.

Credit, 3.

Mr. VALLANCE.

61. (I) SOCIAL PSYCHOLOGY.—The social behavior of the individual. Topics considered will include methods of studying social behavior, schools of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, custom and conformity.

3 class hours.

9:00-9:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.

Mr. VALLANCE.

62. (II) SOCIAL PSYCHOLOGY (1951-52).—A survey of multi-individual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion, behavior in crowd situations, social conflict and prejudice. Given in alternate years.

3 class hours.

11:00-11:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.

Mr. VALLANCE.

63. (I) PHYSIOLOGICAL PSYCHOLOGY.—A study of the relationships between physiological processes and behavior. Major emphasis will be placed upon the structure and mechanisms of the central nervous system and sense organs, endocrine functions, and drives.

3 class hours.

11:00-11:50 M. W. F.

Prerequisites, Psychology 26; Zoology 35.

Credit, 3.

Mr. FELDMAN.

72. (II) **ADVANCED EXPERIMENTAL PSYCHOLOGY.**—The literature, techniques, and apparatus of experimental psychology are considered, and selected projects are carried out individually by the members of the class. 1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 Th.; 1:00-2:50 Tu. Th. Mr. NEET.
Prerequisite, Psychology 51.

75. (I) **STATISTICS IN PSYCHOLOGY.**—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields. Credit, 3.
2 class hours; 1 2-hour laboratory period. Mr. Goss.
2:00-2:50 M. F.; 3:00 4:50 W.
Prerequisites, Psychology 26; Agricultural Economics 79 or Mathematics 62.

81. (I) 82. (II) **PSYCHOLOGICAL TESTS.**—Different varieties of psychological tests are studied. The first semester considers group tests of intelligence, aptitude, interest, personality, and clinical tests. The second semester is devoted to a consideration of individual and performance tests of intelligence and to the nature and theories of intelligence. Practice will be given in administering, scoring, interpreting, and evaluating tests. Either semester may be elected independently. Credit, 3.
1 class hour; 2 2-hour laboratory periods. Mr. KRASNER.
1:00-1:50 F.; 1:00-2:50 M. W. or 3:00-4:50 Tu. Th.
Prerequisite, Psychology 26.

83. (I) **ABNORMAL PSYCHOLOGY.**—A study of the principles relative to the causes, symptoms, and treatment of behavior abnormalities. Special attention is given to the following: dynamics of behavior abnormalities, speech problems, emotional extremes, memory losses and other disorders of association, the neuroses and psychoses, and mental deficiency. Hospital trips and clinics. Credit, 3.
3 class hours. Mr. NEET.
10:00-10:50 M. W. F.
Prerequisite, Psychology 26.

86. (II) **INDUSTRIAL PSYCHOLOGY.**—The course aims to give understanding of psychological principles and methods in business and industrial situations. Topics considered include: employee selection and training, motivation and morale, design of machines and equipment, working conditions, fatigue, accident prevention, and advertising and selling. Credit, 3.
3 class hours. Mr. RONAN.
9:00-9:50 M. W. F.
Prerequisite, Psychology 26.

88. (II) **PSYCHOLOGY OF GUIDANCE.**—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases. Credit, 3.
2 class hours; 1 2-hour laboratory period. Mr. _____.
9:00-9:50 Tu. Th.; 3:00-4:50 M. or W.
Prerequisite, Psychology 26 and 81 or consent of the instructor.

90. (II) CONTEMPORARY PSYCHOLOGIES.—A logical, historical, and systematic analysis of contemporary psychological theories, including structuralism, functionalism, Gestalt and organismic psychologies, psychoanalysis, and behaviorisms from Thorndike and Watson to the contemporary scene.

3 class hours.

2:00-2:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.

Mr. Goss.

92. (II) CLINICAL PSYCHOLOGY.—A study of the techniques and methods involved in the diagnosis and treatment of behavior disorders. Diagnostic clinical testing, counselling, and other psychotherapeutic procedures are given consideration. Hospital trips and clinics.

3 class hours..

11:00-11:50 M. W. F.

Prerequisite, Psychology 83 or consent of the instructor.

Credit, 3.

Mr. FELDMAN, Dr. MICHELSON.

93. (I) PSYCHOLOGY OF ADOLESCENCE (1950-51).—A consideration of the development, and emotional, social, and intellectual adjustment of the individual during the adolescent years. Given in alternate years.

3 class hours..

9:00-9:50 Tu. Th. S.

Prerequisite, Psychology 26.

Credit, 3.

Mr. Goss.

94. (II) CHILD PSYCHOLOGY.—This course aims to develop an understanding of the behavior of the child. Psychological aspects of the following topics are considered: original nature, maturation, play, social behavior, personality and mental hygiene. Nursery school observation and practice.

3 class hours.

10:00-10:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.

Mr. NEET.

95. (I) 96. (II) PROBLEMS IN PSYCHOLOGY.—For qualified seniors. The student will be allowed to do independent work and study on special problems or in certain fields of psychological interest. By arrangement with the members of the department.

Credit, 1.

THE DEPARTMENT.

ROMANCE LANGUAGES

Professor FRAKER, Professor GODING, Professor CAAMAÑO,* Assistant Professor CLARKE, Assistant Professor FERRIGNO, Assistant Professor JOHNSON, Mr. CESTRE, Mr. WEXLER.

French

1. (I) 2. (II) ELEMENTARY FRENCH.—For those who have had no previous French or whose preparation is insufficient for more advanced courses. Intensive drill for rapid reading, writing, speaking and under-

* Visiting Professor.

standing. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

4 class hours.

Credit, 3.
THE DEPARTMENT.

3. (I) 4. (II) *INTERMEDIATE FRENCH*.—Primarily a reading course with stress on both exact translation and rapid reading for comprehension. Grammar review and oral practice. Recommended for those who want only a reading knowledge of French.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, French 1 and 2, or 2 years of high school French.

5. (I) 6. (II) *ADVANCED INTERMEDIATE FRENCH*.—Readings from representative masterpieces of French literature. Composition, grammar review, intensive oral practice.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, French 3 and 4, or 2 years of high school French, or permission of the Department.

9. (I) 10. (II) *ORAL PRACTICE*.—Not open to freshmen except in conjunction with another course in French. Intensive oral practice, vocabulary study, grammar essentials for fluent speech. Recommended for those who desire a reasonably good command of the spoken language.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, French 3 and 4 or equivalent or permission of the instructor.

15. (I) 16. (II) *SURVEY OF FRENCH LITERATURE*.—Readings from representative masterpieces of French literature. Review of grammar. Composition, outside reading. Conducted in French except for one section conducted in English.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, French 5 and 6 or 3 years of high school French.

Advanced Courses

Prerequisites, French 15 and 16, or French 5 and 6 and permission of the instructor. Since most of the advanced courses are conducted in French, the student should have a reasonable oral command of the language before electing these courses. For this purpose the student is advised to take French 9 and 10, or spend one year in the French House.

29. (I) 30. (II) *FRENCH LITERATURE OF THE SEVENTEENTH CENTURY (1551-52)*.—A survey of the Classic period, with readings from representative works. Given in alternate years.

3 class hours.

Credit, 3.
Mr. FRAKER.

31. (I) 32. (II) FRENCH LITERATURE OF THE NINETEENTH CENTURY (1950-51).—A detailed study of the more important authors and movements. Given in alternate years.

3 class hours.

Credit, 3.
Mr. GODING.

51. (I) FRENCH LITERATURE OF THE EIGHTEENTH CENTURY (1950-51).—*Rosseau: The Encyclopedists*. Given in alternate years.

3 class hours.

Credit, 3.
Mr. FRAKER.

52. (II) VOLTAIRE (1950-51).—A study of the Eighteenth Century through the life and works of Voltaire. Given in alternate years.

3 class hours..

Credit, 3.
Mr. FRAKER.

53. (I) 54. (II) FRENCH LITERATURE OF THE TWENTIETH CENTURY.

3 class hours.

Credit, 3.
Miss CLARKE.

75. (I) 76. (II) COURSE DE STYLE.—A study of syntax and idioms at an advanced level. The student is taught how to express himself clearly and logically in living French.

4 class hours.

Credit, 3.
Mr. CESTRE.

79. (I) FRENCH CIVILIZATION.—A study of those elements which lie back of the cultural contribution of France to the world civilization. Subjects studied will include arts, sciences, school systems, the press, the family, social classes, influences of history and geography. The assigned readings will be drawn from contemporary French Literature.

4 class hours.

Credit, 3.
Mr. GODING.

80. (II) TEACHER TRAINING COURSE.—Practice teaching, methods, outside readings, observations, reports.

4 class hours.

Credit, 3.
Mr. GODING.

82. (II) ADVANCED GRAMMAR AND COMPOSITION.—Phonetics. Recommended for majors who intend to teach French.

4 class hours.

Credit, 3.
Mr. GODING.

Italian

51. (I) 52. (II) ELEMENTARY ITALIAN.—An introductory course for those who have had no previous Italian or whose preparation is insufficient for more advanced work. Training in grammar, composition, pronunciation, with special emphasis on reading.

4 class hours.

Credit, 3.
Mr. FERRIGNO.

75. (I) 76. (II) INTERMEDIATE ITALIAN.—Primarily a reading course with considerable attention to review of grammar, and speech.
4 class hours.

Credit, 3.

Mr. FERRIGNO.

Spanish

1. (I) 2. (II) ELEMENTARY SPANISH.—Grammar, exercises in composition and conversation, reading of selected short stories. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours; 4th hour optional.

Credit, 3.

Mr. FRAKER, Mr. FERRIGNO.

7. (I) 8. (II) INTERMEDIATE SPANISH.—Readings from modern authors; grammar review.

3 class hours; 4th hour optional.

Credit, 3.

Mr. FERRIGNO.

Prerequisites, Spanish 1 and 2 or three years of high school Spanish.

29. (I) THE ROMANTIC PERIOD (1952-53).—Readings from representative authors; written and oral composition. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisites, Spanish 7 and 8.

30. (II) THE MODERNISTS (1950-51).—Dario, Nervo and their contemporaries; composition and conversation. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisite, Spanish 29.

73. (I) 74. (II) THE GOLDEN AGE (1951-52). Readings from Cervantes, Lope de Vega, Calderon, Garcilaso and others. Composition and conversation. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisites, Spanish 7 and 8.

Russian

51. (I) 52. (II) ELEMENTARY RUSSIAN.—Grammar, exercises in composition and conversation, selected readings. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.
4 class hours.

Credit, 3.

Mr. GABRYS.

Prerequisite, previous language training.

SOCIOLOGY

Professor KORSON, Mr. DRIVER, Mr. MANFREDI, Mrs. GOSS.

28. (I) and (II) INTRODUCTION TO SOCIOLOGY.—an outline of the social order, and of the individual considered as a member of his various groups.

3 class hours.

Credit, 3.

THE DEPARTMENT.

51. (I) URBAN SOCIOLOGY.—A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Characteristics of the population, urban ecology, and problems of adjustment in the fields of housing, health, education, and recreation.

3 class hours.

Credit, 3.

2:00-2:50 Tu. Th., third hour by arrangement.

Mr. MANFREDI.

Prerequisite, Sociology 28.

52. (II) RURAL SOCIOLOGY.—A study of rural society from the standpoint of its population, institutions, standards of living, and their relation to urban society.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

53. (I) AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.—A non-technical sociological study of man in pre-literate societies.

3 class hours.

Credit, 3.

Mr. MANFREDI.

Prerequisite, Sociology 28.

54. (II) AMERICAN RACE RELATIONS.—The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. A rabbi, minister, and priest are invited to address the class, and visits are made to the respective churches.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

57. (I) THE FAMILY.—The history and development of the customs of courtship and marriage from primitive society to the American family. The basic causes of changes and trends of the family are considered. The folkways and mores of marriage in other contemporary societies are also studied.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

61. (I) POPULATION PROBLEMS.—An analytical study of population trends and problems of the world; the origin, composition, growth, migration, and urbanization of the American population. A consideration of population pressure as a cause of migratory movements.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisite, Sociology 28.

75. (I) SOCIAL PROBLEMS.—A study of abuses affecting the home, recreation, business, industry, family, welfare, public health, government,

mental disease, and crime. The charitable and correctional institutions of Massachusetts as agencies of reform. Visits to Belchertown State Schools, Northampton State Hospital and Northampton Superior Court are arranged, and specialists in their fields will be invited as speakers.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. DRIVER.

Prerequisite, Sociology 28.

76. (II) INTRODUCTION TO SOCIAL WELFARE.—For senior majors and others who qualify. Contemporary problems of social concern: causes of poverty; methods of caring for adult and child dependents and defectives. A consideration of public and private agency administration and techniques, and an examination of federal, state, and local community programs.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisites, Sociology 28, 51, 75.

78. (II) CRIMINOLOGY.—A study of the nature of crimes and the factors underlying criminal behavior. Attention is also given to the machinery of justice in criminal behavior: the law, the courts, police enforcement, penal and correctional institutions.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisite, Sociology 75.

79. (I) 80. (II) SEMINAR.—Admission by permission of instructor. A study of the methods of research employed by sociologists. Students, under direction of the instructor, analyze and organize such sociological material as they gather through their own research. Projects must be approved in advance by the instructor.

Credit, 3.

Hours by arrangement.

Mr. KORSON.

82. (II) SOCIOLOGICAL THEORY.—An examination of the contributions of European and American writers who have concerned themselves with theories of the origin, growth, and development of human social organization.

3 class hours.

Credit, 3.

Mr. MANFREDI.

Prerequisite, Sociology 53.

SPEECH

Associate Professor NIEDECK, Mr. ZAITZ, Mr. STELKOVIS, and the
INSTRUCTORS IN ENGLISH.

3. (I) 4. (II) PUBLIC SPEAKING.—This course is designed to give the student introductory instruction and opportunity in oral self-expression and includes both public speaking and literary interpretation. Scheduled under English 1, 2.

1 class hour.

Credit, 1.

THE DEPARTMENT.

89. (I) DRAMATIC PRODUCTION.—This course offers instruction and practice in casting, directing, make-up, lighting, and scenic design and construction.

3 2-hour laboratory periods.

Credit, 3.

Mr. NIEDECK, Mr. ROBERTSON.

91. (I) (II) EXTEMPORE SPEECH.—The theory and practice of public speaking for business and professional purposes.

3 class hours.

Credit, 3.

Mr. NIEDECK, Mr. ZAITZ, Mr. STELKOVIS.

92. (II) FORMAL DISCUSSION.—Most of the semester is devoted to formal discussion: its organization and presentation. Students are given the opportunity to lead and to participate in discussions of current problems.

3 class hours.

Credit, 3.

Mr. ZAITZ.

Prerequisite, Speech 91.

VETERINARY SCIENCE

Professor BULLIS, Associate Professor SMITH.

75. (I) COMPARATIVE VETERINARY ANATOMY.—A study of the structure of vertebrates with emphasis upon the comparative structure of domesticated animals, both mammals and birds.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. SMITH.

76. (II) GENERAL VETERINARY PATHOLOGY.—An introduction to the study of disease—causes, transmission, structural changes, and defense mechanisms; and the application of these principles to the prevention, control, and eradication of the common communicable and non-communicable diseases of farm animals.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. SMITH.

Prerequisite, Veterinary Science 75.

78. (II) GENERAL VETERINARY PATHOLOGY.—This course is similar to Veterinary Science 76 except that diseases of importance to wildlife, and diseases of animals transmissible to man will be considered.

3 class hours.

Credit, 3.

Mr. SMITH.

Prerequisites, Bacteriology 31, Zoology 35 or 71.

88. (II) AVIAN PATHOLOGY.—This course is similar to Veterinary Science 76 but with application to specific communicable and non-communicable diseases of poultry.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. BULLIS.

Prerequisite, Veterinary Science 75.

ZOOLOGY

Professor WOODSIDE, Professor BISHOP, Assistant Professor TRAVER, Assistant Professor BARTLETT, Assistant Professor ROLLASON, Assistant Professor SNEDECOR, Mr. ANDREWS, Mr. KATSH,† Mr. NUTTING, Mr. RAUCH, Mr. HONIGBERG, Mr. DEARDEN, Mr. SWENSON.

1. (I) and (II) **INTRODUCTORY ZOOLOGY**.—This course provides an introduction to the principles of biology, with special reference to the zoological aspects. The structure and activities of a representative vertebrate animal, the frog, are considered in detail and the knowledge thus gained is utilized in a comprehensive survey of the major groups of the animal kingdom. Brief introductions are given to the principles of classification, nutrition, structure and functions of protoplasm, genetics, heredity, development, and evolution.

2 class hours; 1 3-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th. or 11:00-11:50 M. W.; laboratory hours as sectioned.
Mr. WOODSIDE, Mr. ANDREWS, Mr. KATSH.

25. (I) **SURVEY OF THE ANIMAL KINGDOM**.—Lectures emphasize those aspects of the zoological sciences which are least stressed in the introductory course; the principles of classification; ecology; economic importance; and the history of zoology in relation to man's progress. The laboratory work will include several exercises in field work; studies on representatives of phyla not covered previously; the morphological adaptations of animals to special modes of existence; and some simple zoological techniques.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 Tu. or W. or Th.
Mr. BARTLETT, Mr. NUTTING, Mr. HONIGBERG.

Prerequisite, Zoology 1.

35. (I) and (II) **VERTEBRATE PHYSIOLOGY**.—An introductory course which will include consideration of circulation, respiration, digestion, metabolism, excretion, chemical and nervous coordination, muscular activity, and reproduction. The laboratory work will acquaint the student with some of the equipment and methods used in physiological studies, with emphasis on the experimental approach to the laboratory exercises.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. SNEDECOR, Mr. KATSH, Mr. SWENSON.

50. (II) **HISTOLOGY OF THE VERTEBRATES**.—A study of the types of tissues found in the body of vertebrate animals, and of the organs in which these tissues occur. Tissues and organs of mammals are emphasized. A knowledge of comparative anatomy is advised.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
8:00-8:50 Tu.; 1:00-2:50 Tu. Th.
Prerequisite, Zoology 1.
Mr. ROLLASON.

† On leave of absence

51. (I) and (II) **MICROTECHNIQUE OF ANIMAL TISSUES.**—The course comprises (1) a consideration of the principles and methods of micro-technique as applied to animal tissues, and (2) a series of practical exercises in the preparation of animal tissues for microscopic examination. Registration is limited to 12 students per semester. Consult instructor for section assignments.

2 2-hour laboratory periods.

Credit, 2.

Mr. HONIGBERG.

Prerequisite, Zoology 1.

53. (I) **PRINCIPLES OF GENETICS.**—Lectures and laboratory experiments concerning the laws governing the transmission of hereditary factors in plants and animals, expression and action of genes, population genetics, and the relationship of genetics to other biological sciences. A laboratory period may be substituted for one class hour.

3 class hours.

Credit, 3.

11:00-11:50 M. F.; 1:00-4:00 M. or 2:00-5:00 F., or 9:00-12:00 Tu.

Mr. RAUCH.

69. (I) **ANIMAL PARASITOLOGY.**—Important protozoan and helminthic parasites of man and domestic animals. Emphasis is placed upon morphology, physiological activities, classification and phylogeny of the parasite; life cycles, vectors, and modes of transmission; host-parasite relationships, and other fundamental principles of parasitism as a way of life.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss TRAVER.

Prerequisite, Zoology 1.

70. (II) **ADVANCED INVERTEBRATE ZOOLOGY.**—A survey of the invertebrate animals from evolutionary and phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space, are considered, as well as classification. Marine, freshwater and land faunas representative of each major group are studied.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss TRAVER.

Prerequisite, Zoology 25 or equivalent.

71. (I) **COMPARATIVE VERTEBRATE ANATOMY.**—A thorough study of the anatomy of the vertebrates, with emphasis on the evolution, special modifications, and functional interrelationships of each of the organ systems. A systemic approach in both lecture and laboratory work. Animals studied in the laboratory are: protochordates, lamprey, dogfish, mud-puppy, and cat.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 1:00-3:50 W. F. or 2:00-4:50 Tu. Th.

Mr. BARTLETT, Mr. DEARDEN.

Prerequisite, Zoology 1.

72. (II) VERTEBRATE EMBRYOLOGY.—Lectures and laboratory work dealing with the development of representative animals, special emphasis being placed on the amphibian, bird and mammal.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu, Th.; 2:00-4:50 W. F. or 2:00-4:50 Tu, Th.

Mr. WOODSIDE, Mr. RAUCH, Mr. DEARDEN.

Prerequisite, Zoology 71.

73. (I) GENERAL CYTOLOGY.—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and laboratory work will deal with cytoplasmic structure and inclusions and nuclear phenomena.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROLLASON.

Prerequisites, Zoology 50, 51.

74. (II) LIMNOLOGY, THE STUDY OF INLAND WATERS.—In this course an opportunity is afforded to become acquainted with the plant and animal life of certain lakes, bogs, and streams in the vicinity of Amherst; with the physical and chemical factors influencing each such environment; and with the geological factors which have been responsible for the present configuration of this entire area. Five departments—geology, public health, botany, entomology, and zoology—are cooperating in the presentation of this course. Enrolment limited to sixteen. Consult Miss Traver for permission to register.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Miss TRAVER, Mr. ALEXANDER, Mr. WILSON, Mr. HANSON, Mr. BARTLETT,

Miss SMITH, Mr. ANDREWS, Mr. SNOW, Mr. PUTALA.

Prerequisites, Botany 1, Zoology 1, Chemistry 1, 2.

77. (I) EXPERIMENTAL EMBRYOLOGY.—Lectures, seminar reports and laboratory work dealing with the chief factors in the mechanics and physiology of development: the germ cells; fertilization, establishment of the primary axis; embryonic induction and differentiation.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. WOODSIDE.

Prerequisite, Zoology 72.

80. (II) ORNITHOLOGY.—An introduction to the study of ornithology which aims to serve as a basis for further technical study or for the development of a life-time hobby. Lectures are of a general nature covering as many branches of ornithological knowledges as possible. Laboratory work includes field identification and the anatomy of the pigeon.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Th.; 3:00-4:50 M. F.

Mr. BARTLETT, Mr. NUTTING.

Prerequisites, Zoology 1.

81. (I) VERTEBRATE ZOOLOGY.—An introduction to the vertebrates, their classification and ecology, with particular emphasis on the fishes.

Field trips for the study of local fauna will be included as a part of the laboratory exercises. Course limited to eighteen students.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 Tu. Th.

Mr. ANDREWS, Mr. BARTLETT.

Prerequisite, Zoology 1.

83. (I) COMPARATIVE PHYSIOLOGY.—A course designed to familiarize students with physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla. In the laboratory the experimental method will be developed involving general procedures and individual problems.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Mr. BISHOP, Mr. SWENSON.

Prerequisites, Zoology 1, 35.

84. (II) GENERAL CELLULAR PHYSIOLOGY.—The properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, bioelectricity, and reproduction.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Mr. BISHOP, Mr. KATSH, Mr. SWENSON.

Prerequisites, one year biology; organic chemistry.

85. (I) CLASSES OF ARTHROPODS OTHER THAN INSECTS.—Arthropods are studied from the phylogenetic standpoint, with special reference to their relationship to the origin and evolution of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Tu.; 1:00-2:50 Tu. Th.

Mr. HANSON.

86. (II) FISHERY BIOLOGY.—Theory in the practice of regulating freshwater fisheries: the physical and biological conditions of the environment and their influence on fish populations.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. ANDREWS.

Prerequisite, Zoology 81 and permission of instructor.

87. (I) ENDOCRINOLOGY.—Emphasis will be directed toward the importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.) in a variety of animals.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SNEDECOR.

Prerequisite, Zoology 1.

91. (I) 92. (II) SPECIAL PROBLEMS IN ZOOLOGY.—Qualified graduate students and seniors who have met departmental requirements for specialization in the field of zoology may arrange for work on a special problem in zoology.

Credit, 3.

THE DEPARTMENT.

Invertebrate Zoology, Marine Biological Laboratory, Woods Hole, Massachusetts.

Credit, 3.

Invertebrate Embryology, Marine Biological Laboratory, Woods Hole, Massachusetts.

Credit, 3.

DEGREES CONFERRED 1950

RECIPIENTS OF HONORARY DEGREES

Earl Sumner Draper—*Doctor of Landscape Architecture*
Herbert Charlesworth Brewer—*Doctor of Science*
George Freeman Parmenter—*Doctor of Science*
Percy LeBaron Spencer—*Doctor of Science*
Ernest Elwood Stanford—*Doctor of Science*
Sidney Waugh—*Doctor of Fine Arts*

BACHELOR OF SCIENCE

Summa Cum Laude

Theodore Delevoryas
Guy Arthur Franceschini

Stuart Richard Gunn
James P. Toomey

Magna Cum Laude

William Dean Athearn
Horace Huntingdon Brown, Jr.
Elizabeth Pauline Burr
Barbara Lucy Freeman
Theodore Joseph Goodman
John William Grenier
George Eugene Maurice

Homer Blaine Miller, Jr.
Eugene Charles Putala
Robert Ervin Putnam
Emmanuel Mann Roth
Edna Elizabeth Steinbeck
*Alan Nelson Young

Cum Laude

Burton Richard Anderson
Eleanor Carr Burt
Edwin Brainard Caswell
Estelle Rose Chase
Peter Joseph Drevinsky
Hyman Saul Edelstein
Tracy Ivan Flagg
Ann Lackens Guba
Margot Fraser Hakes
Donald Edward Hattin
John Thomas Katsanos
John Merriam Kingsbury
Howard Byron Lovering

Dominic Alexander Marini
John Vincent Moreau
Gordon James Muise
John Anthony O'Connor
Frank Quimby Orrall
Paul Pincus
John Albert Rikert
William Smith Ryder, Jr.
Judith Stoyle
Arden Claire Sullivan
Warwick Manson Tinsley, Jr.
Irving Wasserman

Rite

Shirley Marie Adams
Daniel George Alex
Alexander Allan Alexander
Donald Macomber Allen
Peter Francis Anastasia
Lorene Smith Andersen
Clinton Edward Anderson
David Eugene Anderson
Donald Lindsay Anderson
Fred Anderson, Jr.

Leonard Eugene Anderson
Mary Catherine Armato
Marshall Frederick Aronson
Jaspard Harvey Atkins
Vitie Charles Atkocius
Richard Pierce Babbitt
Harry Lawrence Bain
Kevin Joseph Barlow
Russell Tuller Barnes
Roger Thomas Barron

- Barbara Arey Bartlett
 George Elian Battit
 Edward Stone Beal
 Robert Alvin Bennett
 William Joseph Bennett
 David Adams Benson
 *Jason Stuart Berger
 Joseph Merton Bernard
 Paul Emile Bernardin
 Roland George Bernier
 Lawrence Melvin Bernstein
 Marion Moody Berry
 William Francis Berry
 Howard Alan Biegel
 James Leonard Billings
 Philip James Blanchard, Jr.
 Donald Woodburn Bliss
 Warren Spaulding Blodget
 Rosalind Barbara Bonazzoli
 Chester Alexander Bonnallie, Jr.
 *Francis William Botsch
 Zane Audbrey Bower
 John Farley Boyle
 George William Boylen, Jr.
 Robert Ambrose Brennan
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 Edward Anthony Nebesky
 Kenneth Rayeraft Newman
 Phiroze Kaikhasru Patel
 Ikram Ahmed Rashid

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UNIVERSITY OF MASSACHUSETTS ENROLLMENT OCTOBER 1950

UNDERGRADUATE COLLEGE

SCHOOL	Class....	1951		1952		1953		1954		Total		Total
		Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
Liberal Arts		113	52	93	63	100	77	91	145	397	337	734
Science		109	21	99	29	111	45	134	52	453	147	600
Agriculture and Horticulture		96	7	98	4	75	11	110	8	379	30	409
Engineering		133	0	100	0	69	0	77	0	379	0	379
Business Administration		69	3	69	3	71	4	103	4	312	14	326
Home Economics		0	32	0	47	0	63	0	99	0	241	241
Division of Physical Education		19	0	5	0	12	0	24	0	60	0	60
Specials										9	18	27
TOTALS		539	115	464	146	438	200	539	308	1989	787	2776

GRADUATE SCHOOL

Men	Women	Total
284	26	310

STOCKBRIDGE SCHOOL

Class....	1951		1952		Total
	Men	Women	Men	Women	
	195	4	233	6	438

SUMMER SCHOOL 1950

Men	Women	Total
323	86	409

SUMMARY (October 1950)

Undergraduate College	2776
Graduate School	310
Stockbridge School	438
TOTAL ENROLLMENT	3524

GIFTS AND BEQUESTS

For the information of those who may wish to make a gift or a bequest to this University, the following suggestion is made as to a suitable form which may be used.

There are a number of worth-while activities of the University which are handicapped by lack of funds and for which small endowments would make possible a greater measure of service to our students and to the Commonwealth. The religious work on the Campus is an example. This is now carried on in a very limited way by current private contributions. Further information concerning this and other activities in similar need will be gladly furnished by the President.

SUGGESTED FORM

"I give and bequeath to the Trustees of the University of Massachusetts, at Amherst, Massachusetts, the sum of dollars."

(1) (Unrestricted)

"To be used for the benefit of the University of Massachusetts in such manner as the Trustees thereof may direct."

or (2) (Permanent Fund: income unrestricted)

"to constitute an endowment fund to be known as the Fund, such fund to be kept invested by the Trustees of the University of Massachusetts and the income used for the benefit of the College in such manner as the Trustees thereof may direct."

or (3) (Specific Purposes)

"to be used for the following purposes,"

(Here specify in detail the purposes.)

*Other University of Massachusetts
Catalogues:*

- Summer School Catalogue
- Graduate School Catalogue
- Stockbridge School Catalogue

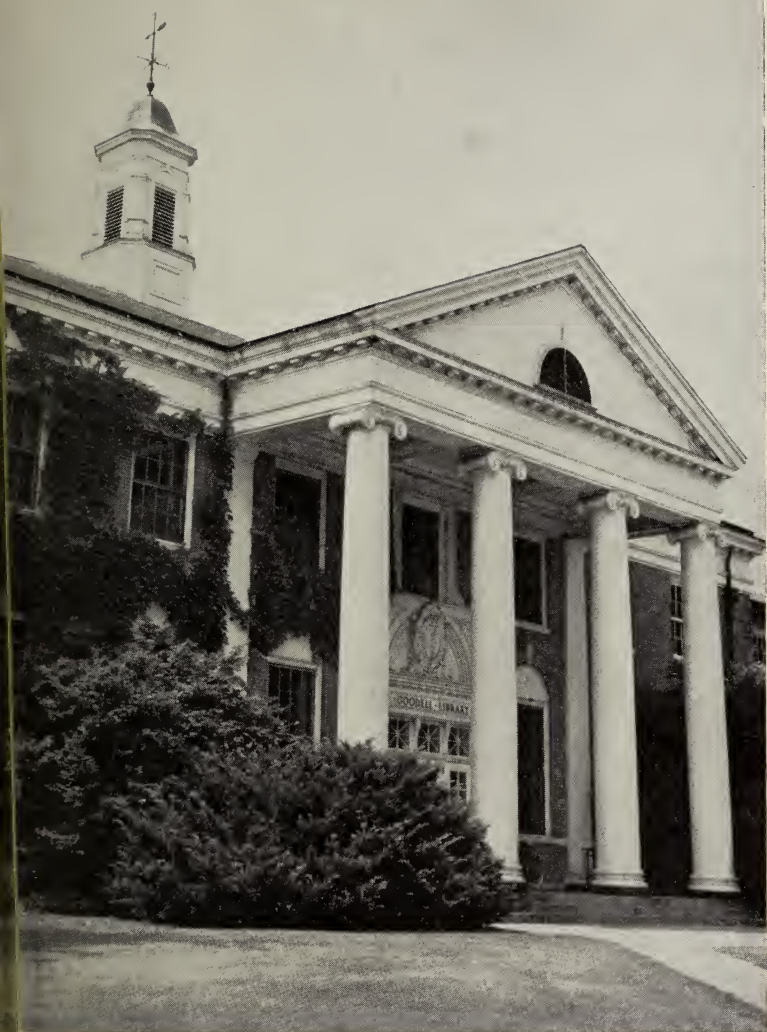
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THE UNIVERSITY
OF MASSACHUSETTS

Bulletin

Bulletin

THE UNIVERSITY OF MASSACHUSETTS

Graduate School Number

1951 - 1952

1952 - 1953



The Graduate School Catalogue for the sessions of 1951-1952, 1952-1953 is part of the Eighty-eighth Annual Report of the University of Massachusetts and in conjunction with the general catalogue of The University it constitutes Part II of Public Document 31 (Sec. 8, Chapter 75, of the General Laws of Massachusetts).

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CALENDAR

1951

June 18, Monday	First half of Summer School begins
July 28, Saturday	First half of Summer School ends
July 30, Monday	Second half of Summer School begins
September 8, Saturday	Second half of Summer School ends
September 17, Monday	Registration of Freshman, Senior and Graduate Students
September 18, Tuesday	Registration of Sophomore and Junior Students
September 19, Wednesday	Classes begin for all but Freshmen
September 20, Thursday, 8:00 A.M.	Freshmen Classes begin
September 20, Thursday, 10:45 A.M.	First University Convocation
October 12, Friday	Columbus Day. No University Exercises
November 12, Monday	Armistice Day. No University Exercises
November 21, Wednesday, 12:00 M. to November 26, Monday, 8:00 A.M.	Thanksgiving Recess
December 15, Saturday, 12:00 M. to January 3, 1952, Thursday, 8:00 A.M.	Christmas Recess

1952

January 3, Thursday, 8:00 A.M.	Classes Resume
January 17, Thursday, 5:00 P.M.	Classes Stop
January 18, Friday	Registration of Freshman, Senior and Graduate Students
January 19, Saturday	Registration of Sophomore and Junior Students
January 21, Monday to January 30, Wednesday, 5:00 P.M.	Final Examinations
January 30, Wednesday, 5:00 P.M.	First Semester Ends
February 4, Monday, 8:00 A.M.	Second Semester Begins
February 22, Friday	Washington's Birthday. No University Exercises
April 5, Saturday, 12:00 M. to April 14, Monday, 8:00 A.M.	Spring Recess
April 19, Saturday	Patriot's Day. No University Exercises
May 17, Saturday, 12:00 M.	Classes Stop
May 19, Monday to May 29, Thursday, 5:00 P.M.	Final Examinations
May 30, Friday to June 1, Sunday	Commencement

THE TRUSTEES OF THE UNIVERSITY

Organization of 1951

MEMBERS OF THE BOARD

	TERM EXPIRES
MRS. JOSEPH S. LEACH of Walpole	1952
RALPH F. TABOR of West Newton	1952
CLIFFORD C. HUBBARD of Mansfield	1953
JOHN M. DEELY of Lee	1953
HARRY D. BROWN of Billerica	1954
JOHN W. HAIGIS of Greenfield	1954
JOSEPH W. BARTLETT of Boston	1955
PHILIP W. WHITMORE of Sunderland	1955
WILLIAM A. ORTON of Northampton	1956
WILLIAM M. CASHIN of Milton	1956
ALDEN C. BRETT of Belmont	1957
ERNEST HOFTYZER of Wellesley	1957
LEONARD CARMICHAEL of Medford	1958
MRS. ELIZABETH L. McNAMARA of Cambridge	1958

MEMBERS EX OFFICIO

His Excellency PAUL A. DEVER, *Governor of the Commonwealth.*
 RALPH A. VAN METER, *President of the University.*
 JOHN J. DESMOND, JR., *Commissioner of Education.*
 HENRY T. BRODERICK, *Commissioner of Agriculture.*

OFFICERS OF THE TRUSTEES

His Excellency PAUL A. DEVER, *Governor of the Commonwealth, President.*
 JOSEPH W. BARTLETT of Boston, *Chairman.*
 JAMES W. BURKE of Amherst, *Secretary.*
 ROBERT D. HAWLEY of Amherst, *Treasurer.*

The Graduate School Staff

RALPH A. VAN METER, *President of the University.*
 GILBERT L. WOODSIDE, *Dean of the Graduate School.*
 Deans of the Schools.
 Heads of Divisions.
 Heads of Departments in which Graduate Courses are offered.
 Professors, Associate Professors, Assistant Professors and Instructors in charge of courses offered for graduate credit. The entire staff is listed in the General Catalogue of the University.

The Graduate School Council

GILBERT L. WOODSIDE, *Dean of the Graduate School, Chairman.*
 EMMETT BENNETT, *Assistant Professor of Chemistry, Secretary.*
 WILLIAM B. ESSELEN, JR., *Associate Professor of Food Technology.*
 CHARLES F. FRAKER, *Head of the Department of Romance Languages.*
 JOHN HANSON, *Assistant Professor of Insect Morphology.*
 FRED P. JEFFREY, *Head of the Department of Poultry Husbandry.*
 GEORGE A. MARSTON, *Dean of the School of Engineering.*
 WARREN P. MCGUIRK, *Head of the Division of Physical Education.*
 BRUCE MORRIS, *Professor of Economics.*
 ALBERT W. PURVIS, *Head of the Department of Education.*
 FRANK P. RAND, *Dean of the School of Liberal Arts.*
 DALE H. SIELING, *Dean of the School of Agriculture and Horticulture.*
 ANNE W. WERTZ, *Professor of Home Economics.*
 LEONARD R. WILSON, *Head of the Department of Geology and Mineralogy.*

GENERAL INFORMATION

HISTORY

Graduate courses leading to the degree of doctor of science were offered in botany under President Clark and in chemistry under Professor Goessmann as early as 1876. No candidate, however, completed the requirements for that degree. It was not until 1892, under President Henry H. Goodell, that courses leading to the degree of master of science were offered. This degree was first conferred in June, 1896, on two candidates. Graduate courses leading to the degree of doctor of philosophy were first offered in 1897, with chemistry, botany and entomology as major and minor subjects. The first degree was conferred on one candidate in June, 1902.

In the early years the graduate work was conducted under the direct administration of the President in conjunction with the undergraduate program. The demand for advanced work increased, however, and in June, 1908, the trustees made the Graduate School a separate unit in the College.

LOCATION AND LANDS

The University of Massachusetts is located in Amherst, a town of about eight thousand people, overlooking one of the most picturesque sections of the Connecticut Valley. Amherst is eighty-eight miles from Boston, fifty miles from Worcester, twenty-five miles from Springfield, eighteen miles from Greenfield, and eight miles from Northampton. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. The University is well provided with modern buildings and equipment, description of which may be found in the general catalogue.

PURPOSE AND SCOPE OF THE GRADUATE SCHOOL

The purpose of the Graduate School is to provide qualified students with proper guidance in the methods of advanced study and research. Courses are available leading to the degree of doctor of philosophy, master of science, master of arts, master of landscape architecture, master of science in civil engineering, master of science in electrical engineering and master of science in mechanical engineering.

DOCTOR OF PHILOSOPHY

The degree is conferred upon graduate students who have met the following requirements:—

1. The preparation of a satisfactory dissertation.
2. The earning of at least ninety credits, at least sixty of which must be in the major field, at least fifteen in another field or fields related to, but not part of, the major field and not more than thirty in recognition of the dissertation.
3. The passing of a preliminary written comprehensive examination in the major and minor fields supplemented by an oral examination at the option of the major department, both examinations to be conducted by the department concerned, to be passed not later than eight months before the completion of the candidate's work. In case of failure a candidate may be permitted a second and final opportunity, but not within twelve months.
4. Satisfying the following language requirement:—two languages, foreign to the candidate and not in the same linguistic group, as recommended by the major department. Proficiency tests should be passed as early as possible and must be passed prior to the preliminary examination.
5. The passing of a final examination, at least partly oral, conducted by the Thesis Committee primarily upon, but not limited to, the contents of the candidate's dissertation.

6. Satisfying the residence requirement. At least 30 course credits must have been earned at this University. No credit is valid after 9 years.

7. The payment of all fees and expenses.

MASTER OF SCIENCE, MASTER OF ARTS, MASTER OF SCIENCE IN CIVIL ENGINEERING, MASTER OF SCIENCE IN ELECTRICAL ENGINEERING, MASTER OF SCIENCE IN MECHANICAL ENGINEERING.

The basic requirements for the above degrees are:—

1. Thirty credits, of which not more than six may be transferred from other institutions. Twenty-one of the thirty credits must be in the major field. If a thesis is offered, six credits must be earned in courses open to graduate students only; if a thesis is not offered, twelve credits must be earned in courses open to graduate students only. Not more than ten credits may be earned by means of a thesis. No credit is valid after 6 years.

2. The thesis is optional with the school or department, but if there is one it shall be under the supervision of a committee appointed by the Scholarship Committee of the Graduate School Council and shall culminate in an oral general examination to be conducted by the same committee. If there is no thesis, the candidate shall take a general examination, written or oral, or both under the supervision of the head of his major department. If a student offers a thesis, problem courses shall be limited to three credits; if a thesis is not offered, the limit shall be six credits.

3. All foreign language requirements are optional with the school or departments.

4. All fees and expenses must be paid before the degree will be conferred.

MASTER OF LANDSCAPE ARCHITECTURE

The degree is conferred upon graduate students who have met the following requirements:—

1. Work covering at least two years, of which a minimum of one and one-half years must be devoted to study in residence, and a minimum of one-half year spent in practice, specific requirements concerning the nature of such practice to be laid down by the department.

2. Submission of a written report on the work done in practice, or on oral examination conducted by the department staff.

3. The earning of not less than forty-five credits of which thirty shall conform essentially to the "fifth year program" (see page 60) the remainder to be selected from the "200 series" on page 58, with minor deviations at the discretion of the department.

4. Preparation of a satisfactory thesis.

5. The passing of final examinations, written and oral.

6. Payment of all fees and expenses.

ADMISSION

Students may be admitted to the Graduate School either on limited status or on full status.

A. Requirements for admission on limited status:—

1. A Bachelor's Degree or its equivalent from any college or university of recognized standing.

2. An official transcript of all previous college work.

3. A letter of recommendation from the head of the department of the applicant's undergraduate major or a letter from his present employer. Under certain circumstances a student may enroll tentatively in courses in the University without having fulfilled requirements 2. (official transcript) and 3. (a letter from

the head of the department of the applicant's undergraduate major or a letter from his present employer) but no credit will be given until the requirements are fulfilled.

4. Acceptance by the department and by the Admissions Committee of the Graduate School Council.

Graduate students on limited status will be held to the same standard of performance as Graduate Students on full status. If they wish to become Graduate Students on full status they may petition the Admissions Committee of the Graduate School Council.

They may attain full status on the completion of a satisfactory record at this University, the recommendation of the department concerned, and the approval of the Committee on Admissions.

B. Requirements for admission on full status:—

1. A Bachelor's Degree or the equivalent from any college or university of recognized standing.

2. An official transcript of all previous college work.

3. A letter of recommendation from the head of the department of the applicant's undergraduate major.

4. A letter of recommendation from someone (not connected with the applicant's undergraduate major) who is qualified to judge the student's ability in academic work.

5. The applicant must have been in the upper half of his graduating class. (Those who do not meet this requirement may apply for admission on limited status.) If the transcript does not indicate the rank of the applicant, it is the duty of the Committee on Admissions to evaluate the transcript.

6. Acceptance by the department and by the Admissions Committee of the Graduate School Council.

Admission to the Graduate School on either limited or full status does not imply admission to candidacy for an advanced degree. Such candidacy is subject to specific requirements as laid down by the several departments, and the student must secure the approval of the head of the department in which he desires to major before he can become a candidate for a degree in that subject.

GENERAL STATEMENT

A grade of 80 or above is required of each graduate student in not less than 80 per cent of all the major and minor credits which the student offers to fulfill requirements for an advanced degree. Seventy-five is the minimum passing grade in any graduate course.

Students in the Graduate School may be dismissed for failure to abide by the rules of the University.

The University reserves the right to make changes in the requirements for degrees without notice.

COURSES OFFERED

Courses available as major subjects for the degree of doctor of philosophy:—

Agronomy	Economics
Bacteriology	Entomology
Botany	Food Science
Chemistry	Food Technology

Courses available as major subjects for the master's degree:—

Agricultural Economics	Botany
Agronomy	Chemistry
Animal Husbandry	Civil Engineering
Bacteriology	Dairy Industry

Economics
Education
Electrical Engineering
English
Entomology
Floriculture
Food Technology
Geology and Mineralogy
History
Home Economics
Landscape Architecture
Mathematics

Mechanical Engineering
Olericulture
Philosophy
Physical Education for Men
Pomology
Poultry Science
Psychology
Public Health
Romance Languages
Wildlife Management
Zoology

Courses available as minor subjects:—

Agricultural Economics and
Farm Management
Agronomy
Animal Husbandry
Bacteriology
Botany
Chemistry
Dairy Industry
Economics
Education
Engineering
English
Entomology
Floriculture
Food Technology
Forestry
Geology and Mineralogy
German

Government
History
Home Economics
Landscape Architecture
Mathematics
Olericulture
Philosophy
Physical Education for Men
Physics
Pomology
Poultry Science
Psychology
Public Health
Romance Languages
Sociology
Veterinary Science
Wildlife Management
Zoology

THESES

A thesis must be on a topic in the field of the candidate's major subject, and must indicate that its writer possesses the ability and imagination necessary to do independent constructive thinking. The following rules should be adhered to in the preparation and presentation of a thesis:—

The objective of a thesis should be an attempt to make a real contribution to knowledge and practice. When completed it should be of a quality worthy of publication as a contribution from the department concerned.

The thesis, in its completed form, will be judged largely upon the ability of the author to review literature and reach definite deductions; to formulate a problem, plan a method of attack, and work out a solution; and to summarize his material and draw conclusions. Scholastic attainment in writing and presenting the results of the study will also be an important factor in the evaluation. No thesis markedly poor in its English will be accepted.

Four copies of each Master's thesis outline and six copies of each Doctor's thesis outline are to be transmitted to the Dean of the Graduate School by the head of the department in which the student is majoring. The letter of transmittal should contain the name of the professor within the department who is responsible for the direction of the student's research. This professor will be appointed the Chairman of the student's Thesis Committee. Other possible members of the Thesis Committee might be suggested in the letter of transmittal, but the Scholarship Committee of the Graduate School Council has the responsibility of assigning all faculty members to Thesis Committees.

It is the responsibility of the chairman of the Thesis Committee to arrange a conference with other members of the Thesis Committee and the student for

the purpose of discussing the research problem before approving the thesis outline. This should be done as soon as possible after the appointment of the Thesis Committee.

The fourth (or sixth, if Ph.D.) copy of the student's thesis outline is then to be signed by each member of the Thesis Committee to indicate approval of the outline and to indicate the fact that a conference with the student has been held. The fourth (or sixth) copy of the thesis outline is then to be returned to the Dean of the Graduate School.

The outline for the thesis for the Master's Degree must be presented not later than January first of the year in which the student expects to get the degree, or five months before he expects to complete the work for the degree.

The outline for the thesis for the Doctor of Philosophy degree must be presented by October first, prior to the June Commencement at which the student expects to get the degree.

The Thesis Committee will have direct charge of all matters pertaining to the thesis, and it is recommended that the student use the advice available from this source in the progress of his research. The thesis must have the approval of this committee before arrangements are made for the final examination for the degree.

Three complete, bound copies of the thesis, including drawings and any other accessories, are required by the Graduate School office in order that the files in the Graduate Dean's office, the library and the department in which the thesis was prepared may be supplied. The student is responsible for the binding of the thesis.

If the thesis is printed, whether in periodical or book form, the fact that it is a thesis submitted for an advanced degree at the University of Massachusetts shall be explicitly stated in the title itself or as a footnote on the front page.

Because of the time required to give adequate consideration to the research conducted by the student, it is highly desirable that theses be submitted to the committee, in the case of doctor's theses, not later than March 15, and in the case of master's theses, not later than May 15 of the academic year in which the degrees are to be conferred. The theses in their final bound form shall be deposited with the Dean of the Graduate School by June 1.

If typewritten, whether designed for publication or to remain in the typewritten form, the size of the sheet, the arrangement of the title page, the general structure of the thesis, the character of the paper, and the binding must conform to definite standards.

A. *Size of sheet.* Size of sheet must measure $8\frac{1}{2} \times 11$ inches.

B. *Form of title page.* The title page should be distributed as artistically as possible and must be arranged in this order:

a. Subject.

b. Name of author.

c. "Thesis submitted in partial fulfillment of the requirements for the degree of—"

d. "University of Massachusetts, Amherst."

e. Date.

C. Following the title page, the arrangement may take such form, variable of course with the subject matter, as is illustrated below:—

a. An analytical outline of the thesis.

b. An introductory statement in which the purposes of the author are set forth.

c. The body of the thesis composed of literature critically reviewed and deductions made, formulation of method of attack or procedure, and results secured. (All literature reviews and any work done by others should be so separated that no question can be raised as to which portion

of the thesis represents the original investigation. It should be clearly kept in mind that *compilation* is not considered original investigation.)

- d. Summary and conclusions.
 - e. Bibliography. (This should have the approval of the chairman of the thesis committee before final arrangement.)
 - f. Acknowledgments.
 - g. Statements of approval signed by members of the thesis committee.
- D. *Paper*. See sample in the University store.
- E. *Binding*. See sample of binding in the Graduate School Office.

All theses are the property of the University.

ESTIMATE OF EXPENSES

A charge of \$50 per semester, payable in advance, which covers tuition, laboratory and student health fees, is imposed on students who are residents of Massachusetts. For residents of other states or foreign countries, this charge is \$110 per semester. In cases where students carry less than a full schedule of courses, a special tuition rate is provided. For purposes of definition, all students claiming residence in the State shall at time of admission provide the treasurer's office with an official statement from their town or city clerk as evidence.

Board should not be in excess of \$9 per week. Rooms for graduate students are not available in the dormitories, but can be rented in private homes at from \$20 to \$25 per month. The cost of books and incidentals should not exceed \$150 per year.

LOTTA FELLOWSHIPS

A limited number of fellowships paying \$2000 each are available to students in the broad field of agriculture. Students applying for these fellowships must be interested in earning the Doctor of Philosophy degree for the purpose of serving agricultural pursuits. Application should be made to the Dean of the Graduate School.

LOTTA SCHOLARSHIPS

The Lotta Crabtree Agricultural Fund provides for a limited number of scholarships as an award to worthy graduates of the University of Massachusetts interested in continuing their education in agricultural or physical and biological sciences. These scholarships pay \$500 per annum and application for consideration should be made to the Dean of the Graduate School.

TEACHING FELLOWSHIPS

The University offers a number of teaching fellowships for the purpose of assisting with the instructional program of various departments. The stipend is \$800 per year, and appointments absolve students from tuition and are especially suited to those who desire to gain teaching experience and to make themselves at least partly self-supporting while continuing their education. It should be recognized, however, that, in cases where students render this part-time service in return for the financial assistance extended, the residence time requirement for the degree in question is necessarily longer. Teaching fellows may carry up to 13 credits per semester, but the total in any one academic year may not exceed 24 credits. Application for appointment to these fellowships should be made to the Dean of the Graduate School or to the head of the department in which the candidate's major interest lies.

RESEARCH FELLOWSHIPS

A number of research fellowships are available to qualified graduate students. These are made possible because funds are provided by a). various industries, b). the Experiment Station, or c). research grants awarded to members of the Graduate School Faculty either from sources outside the University or from a fund provided by the University and administered by the Teaching Staff Research Council. Stipends vary with the type of work and the amount of time involved. Interested students should make application to the head of the department in which they plan to work.

THE CRAMPTON RESEARCH FUND

Interest from the Guy Chester Crampton Research Fund is used to help defray the costs of publication of worthy research papers completed by students or occasionally by staff members. Information concerning the fields of work for which grants may be made, and instructions for application, may be obtained from department heads, the chairman of the Crampton Fund Committee or the graduate school office.

GRADUATE COURSES DURING THE SUMMER

The University offers opportunities to pursue graduate courses during the summer in connection with the Summer School. Details regarding courses offered, facilities for study, etc., may be found in the Summer School Catalogue, a copy of which is available upon request to the Dean of the University.

DESCRIPTION OF COURSES

Agricultural Economics

ADRIAN H. LINDSEY, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

202. AGRICULTURAL PRICE THEORY.—The application of economic principles and measurements to the analysis of agricultural prices.

Credit, 3.

Mr. LINDSEY.

204. RESEARCH.—Investigations of problems in Agricultural Economics and Farm Management.

Credit, 3.

Mr. LINDSEY.

300. THESIS.

Credit, 4-10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

155. MARKETING.—An analysis of the problems, types of marketing agencies, principal marketing functions, marketing costs and margins, price quotations and exchange operations, governmental regulations and the consideration of improvement proposals.

Credit, 3.

Mr. LINDSEY.

156. FUNDAMENTALS OF COOPERATION.—A study of the development of co-operative organizations and the economic analysis of cooperative principles and operation.

Credit, 3.

Mr. LINDSEY.

157. AGRICULTURAL CREDIT AND LAND APPRAISAL.—The principles and methods of land valuation and credit extension. There is also a study of the operations of institutions granting credit to agriculture.

Credit, 3.

Mr. LINDSEY.

171. AGRICULTURAL ECONOMIC THEORY.—A comparative and critical study of the significant contributions of the leading economists from Adam Smith to the present.

Credit, 3.

Mr. LINDSEY.

175. FARM ORGANIZATION AND MANAGEMENT.—External and internal economic forces affecting the farm business such as selection and combination of factors of farm production, choice and combination of farm enterprises, and adjusting farm production to markets and prices.

Credit, 3.

Mr. BARRETT.

176. ADVANCED FARM MANAGEMENT.—The use of farm records as a basis for planning and budgeting is emphasized. The last part of the course will be given over to the specific study of selected farms. Field trips are required at an estimated cost of not over five dollars.

Credit, 2.

Mr. BARRETT.

Prerequisite, Agricultural Economics 175.

178. PRINCIPLES OF LAND ECONOMICS.—A study of the utilization of agricultural land and the economic problems of development, settlement, conservation and policy. Credit, 3.

Mr. LINDSEY.

179. ELEMENTARY STATISTICS THROUGH SIMPLE CORRELATION. Credit, 3.

Mr. RUSSELL

180. ADVANCED STATISTICAL METHOD.—Multiple correlation and analysis of variance. Credit, 3.

Mr. LINDSEY and Mr. RUSSELL.

182. ADVANCED FARM OPERATION.—A study of farm operations with special emphasis on time and motion experiments. Credit, 3.

Mr. BARRETT.

189. SEMINAR.—Public and price policy for agriculture. Credit, 2-3.

Mr. LINDSEY.

190. SEMINAR.—Agricultural Institutions. Credit, 2-3.

Mr. RUSSELL

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Economics 155. ECONOMICS OF CONSUMPTION. Credit, 3.
Mr. HALLER.

Economics 156. BUSINESS CYCLES. Credit, 3.
Mr. KIMBALL.

Economics 165. CORPORATION FINANCE. Credit, 3.
Mr. KIMBALL.

Economics 170. MONOPOLIES. Credit, 3.
Mr. HALLER.

Economics 174. ADVANCED ECONOMIC THEORY. Credit, 3.
Mr. DYMOND.

Economics 178. PUBLIC FINANCE. Credit, 3.
Mr. GAMBLE.

Agronomy

WILLIAM G. COLBY, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

211. FIELD CROP PRODUCTION.—A survey course which includes the regional distribution, the cultural requirements, production, and the utilization of the principal field crops grown in the U. S. Given in alternate years, beginning 1951-52. Credit, 3.

Mr. COLBY.

216. FORAGE CROPS.—A survey course which includes the regional distribution, the cultural requirements and the utilization of the principal forage crops grown in the U. S. Given in alternate years, beginning 1952-53. Credit, 3.

Mr. COLBY.

226. CROP IMPROVEMENT.—This is a course in applied genetics involving a study of various plant breeding procedures used in the improvement of important agricultural crops.

Credit, 3.

Mr. YEGIAN.

Prerequisite, Zoology 153, Plant Breeding 152.

263. CHEMISTRY OF THE SOIL.—The chemistry of soil formation, soil acidity, nutrient element availability, ionic exchange and fixation, biological soils reactions, soil-plant-microorganism relationships, and of organic matter of the soil will be discussed. The laboratory work will consist of physical, analytical and biochemical investigations of soils and important soil constituents.

Credit, 3.

Mr. STECKEL.

264. EXPERIMENTAL METHODS IN AGRONOMY.—The purpose of this course is to set forth some of the concepts regarding the application of statistics to the analysis and interpretation of data obtained in agricultural research. Such points as choice of field, design of experiments, effect of competition, interpretation of results, and other special factors that need to be considered in well-planned experiments are discussed.

Credit, 3.

Mr. YEGIAN.

290. SEMINAR.

Credit, 1 each semester.

THE STAFF.

300. THESIS.

Credit, 10-30.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151. FIELD CROPS.—A study of the field crops of the U. S. which will include their uses and improvement, with their soil and climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, seeding methods, tillage, disease and insect control, and methods of harvesting and storage. As an individual problem, each student must make a detailed plan of crop production for the actual conditions of some New England farm.

Credit, 3.

Mr. PARSONS.

152. SOIL UTILIZATION.—The relationship of climate and native vegetation to the broader aspects of soil formation; man's use of land resources; soil use and abuse; soil erosion control and its significance to permanent agriculture.

Credit, 3.

Mr. EVERSON.

153. AGROSTOLOGY.—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highways, airport and cemetery turf.

Credit, 3.

Mr. DICKINSON.

156. AGROSTOLOGY.—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises arranged.

Credit, 3.

Mr. DICKINSON.

157. SOIL FORMATION.—Physical, chemical, biological, climatic and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States.

Credit, 3.

Mr. EVERSON.

179. SOIL PHYSICS.—For seniors in Agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors. Credit, 3.

Mr. EVERSON.

184 A. SOIL CHEMISTRY.—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils. Plant nutrition and microbiological plant interrelationships. Credit, 3.

Mr. STECKEL.

Prerequisites, Chemistry 29, Botany 168, Agronomy 157.

184 B. SOIL CHEMISTRY LABORATORY.—Primarily for seniors in Agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 184 A. Credit, 2.

Mr. STECKEL.

Prerequisites, Chemistry 29, 30, Botany 168, Agronomy 157.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Bacteriology 211. ADVANCED BACTERIOLOGY. Credit, 3.
Miss GARVEY.

Botany 202, 203. ADVANCED PLANT PHYSIOLOGY. Credit, 4 each semester.
Mr. KOZLOWSKI.

Botany 205, 206. ADVANCED PLANT PATHOLOGY. Credit, 2-4 each semester.
Mr. BANFIELD.

Botany 159, 160. THE ANGIOSPERMS. Credit, 3-5 each semester.
Mr. TORREY

Botany 166. GENERAL MYCOLOGY. Credit, 3.
Mr. BANFIELD

Botany 167, 168. INTRODUCTORY PLANT PHYSIOLOGY. Credit, 3 each semester
Mr. KOZLOWSKI

Botany 175. METHODS IN PLANT PATHOLOGY. Credit, 3.
Mr. BANFIELD.

Botany 181. PLANT ECOLOGY. Credit, 3.
Mr. LIVINGSTON.

Botany 182. PLANT GEOGRAPHY. Credit, 2.
Mr. HODGE.

Botany 188. PLANT CYTOGENETICS. Credit, 3.
Mr. SPENSER.

Chemistry 208. CHEMICAL SPECTROSCOPY. Credit, 3.
Mr. SMITH.

Chemistry 210. ATOMIC AND MOLECULAR THEORY. Credit, 3.
Mr. SMITH.

Chemistry 237. BIOCOLLOIDS.	Credit, 3. Mr. TURNER.
Chemistry 151, 152. ORGANIC CHEMISTRY.	Credit, 4 each semester. Mr. RITCHIE and Mr. CANNON.
Chemistry 165, 166. PHYSICAL CHEMISTRY.	Credit, 4 each semester. Mr. FESSENDEN and Mr. SMITH.
Chemistry 179. BIOCHEMISTRY.	Credit, 4. Mr. TURNER.
Civil Engineering 280. APPLIED SOIL MECHANICS.	Credit, 3. Mr. HENDRICKSON.
Geology 201. OPTICAL MINERALOGY.	Credit, 3. Mr. NELSON.
Geology 151. MINERALOGY.	Credit, 3. Mr. NELSON.
Geology 152. PETROLOGY.	Credit, 3. Mr. NELSON.
Geology 161. GEOMORPHOLOGY.	Credit, 3. Mr. WILSON.
Home Economics 203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.	Credit, 3. Miss MITCHELL.
Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.	Credit, 3. Miss MITCHELL.
Plant Breeding 152. ADVANCED PLANT BREEDING.	Credit, 3. Mr. FRENCH.
Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUES.	Credit, 2. Mr. FRENCH.
Plant Breeding 182. SPECIAL PROBLEM IN PLANT BREEDING.	Credit, 2. Mr. FRENCH.
Poultry Science 203. ADVANCED GENETICS.	Credit, 3. Mr. HAYS.
Poultry Science 204. ADVANCED GENETICS.	Credit, 3. Mr. HAYS.

Animal Husbandry

VICTOR A. RICE, Major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

Major credit for Animal Husbandry Department students assumes prerequisites in the Animal Husbandry field as covered in undergraduate courses in this University. All hours by arrangement.

200. ADVANCED ANIMAL NUTRITION.—The chemistry of feed stuffs and the chemistry and physiology of digestion, absorption and utilization of energy, pro-

teins, minerals and vitamins in milk, meat, wool or work production. Recent and current research will be evaluated. Given in alternate years only. Credit, 5.

Mr. ARCHIBALD and Mr. ELLIOT.

Prerequisite, 151 or its equivalent.

210. **ADVANCED ANIMAL BREEDING.**—This course will stress selectively the physiology of reproduction, genetics, systems of breeding and selection according to the student's needs and objectives. The student will, in addition, make a thorough review and analysis of available data in the field of his choice. Not a problem course. Credit, 5.

Prerequisites 175, 176 or equivalent.

Mr. RICE and Mr. COWAN.

220. **MILK SECRETION.**—The fundamentals of milk secretion including the gross and microscopic anatomy of the mammary gland. The development of the mammary gland from birth through parturition and lactation will be studied. The physiology of milk secretion will be reviewed both in relation to the endocrine glands which control it and to more practical aspects of successful dairy cattle management. Credit, 3.

Mr. FOLEY.

230. **ANIMAL HUSBANDRY RESEARCH EVALUATION.**—Some specific phase or phases of research in Animal Husbandry will be selected and a running critical evaluation will be presented weekly in oral form and at semester's end in written form. Credit, 5.

THE STAFF.

240. **PROBLEMS IN LIVESTOCK PRODUCTION.**—This course will deal with some specific problem in feeding, breeding, production or management as relates to the production of some specific livestock product such as milk, wool, meat and so on. Assistance will be given in outlining the problem and setting up the experimental procedure with the student responsible for collecting and analyzing the data. Credit, 5.

THE STAFF.

300. **THESIS.**

Credit, 5-10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(Minor credit only for Animal Husbandry Department Students.)

151. **THE NUTRITION OF FARM ANIMALS.**—The mechanics of digestion, absorption, metabolism, and excretion; the functions of proteins, carbohydrates, fats, vitamins, and minerals in body metabolism; the functions of those endocrine glands primarily concerned with nutrition; the nature and value of the various feed stuffs; and methods of calculating rations in order to meet the requirements of various classes of livestock.

3 class hours; one 2-hour laboratory period.

Credit, 4.

Mr. ARCHIBALD and Mr. ELLIOT.

153. **ELEMENTS OF MEAT PACKING.** For department majors only. The development of the modern packing industry, the history of meat inspection, the principles of meat preservation, the classification of cattle, calves, sheep and swine into proper market classes and grades and slaughtering and dressing operations. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars. Credit, 3.

1 class hour; two 2-hour laboratory periods.

Mr. HALE.

154. MEAT PROCESSING.—For students not majoring in Animal Husbandry. The physical properties, preservation, processing and identification of meats. The laboratory periods will be devoted to slaughtering, cutting, curing, smoking and freezing of meat. One packing plant field trip will be made—approximate cost \$5.00.

Credit, 2.

Permission of instructor is required.

Mr. TIMBERLAKE.

Two 2-hour laboratory periods.

156. BEEF AND SHEEP PRODUCTION.—The historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially in New England. Consideration will be given to types of production, systems and methods of feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and treatment and prevention of external and internal parasites as well as common ailments.

2 class hours; one 2-hour laboratory period.

Credit, 3.

Mr. COWAN.

156A. GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.—This course is given in conjunction with Animal Husbandry 156 and consists of practice in judging and selecting beef cattle, sheep, horses and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments. Credit, 1.

One 4-hour laboratory period.

Mr. COWAN.

172. MEAT JUDGING.—The classification, grading, and judging of carcasses and cuts of beef, veal, lamb and pork.

Credit, 1.

One 4-hour laboratory period.

Mr. HALE.

Prerequisites, Animal Husbandry 151 and 153 or permission of instructor.

174. ADVANCED MEAT STUDIES.—For Animal Husbandry and Food Technology majors.

Credit, 2.

One 4-hour laboratory period.

Mr. HALE.

175. ANIMAL BREEDING.—Reproductive physiology, genetics.

Credit, 4.

Three 2-hour laboratory periods.

Mr. RICE.

176. ANIMAL BREEDING TECHNIQUES.—The practical application of the principles of physiology of reproduction and selection to the improvement of farm animals.

Credit, 1.

One 2-hour laboratory period.

Mr. COWAN.

178. DAIRY CATTLE PRODUCTION.

Credit, 4.

Four 2-hour laboratory periods.

Mr. FOLEY.

179. HORSE AND SWINE PRODUCTION.

Credit, 3.

2 class hours, one 2-hour laboratory period.

Mr. COWAN.

179A. ADVANCED LIVESTOCK JUDGING.—Beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments. Credit, 1.

One 4-hour laboratory period.

Mr. COWAN.

Prerequisite, Animal Husbandry 156A or permission of instructor.

181. SEMINAR.—For Animal Husbandry majors.

Credit, 1.

One 2-hour laboratory period.

Mr. FOLEY.

182. SEMINAR.—For Animal Husbandry majors.

Credit, 1.

One 2-hour laboratory period.

Mr. RICE.

183. ADVANCED MEAT JUDGING.—A continuation of Course 172. Credit, 1.
One 4-hour laboratory period, first half of semester. Mr. HALE.
Prerequisite, Animal Husbandry 172 and permission of instructor.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

Bacteriology 185. IMMUNOLOGY.	Credit, 3. Miss GARVEY
Chemistry 234. ADVANCED BIOCHEMICAL LECTURES.	Credit, 3 Mr. TURNER.
Zoology 220. EXPERIMENTAL EMBRYOLOGY.	Credit, 3 Mr. WOODSIDE.
Zoology 173. GENERAL CYTOLOGY.	Credit, 3. Mr. ROLLASON.
ZOOLOGY 183. COMPARATIVE PHYSIOLOGY.	Credit, 4. Mr. BISHOP.
ZOOLOGY 187. ENDOCRINOLOGY.	Credit, 3. Mr. SNEDECOR.

Bacteriology

RALPH L. FRANCE, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY (For either major or minor credit)

201. HISTORY OF BACTERIOLOGY.—Studies in the development of bacteriology from the late seventeenth century to the present time, especially planned to show the developments of bacteriology in relation to agriculture, public health, the arts, industry and medicine. Credit, 2.
Mr. DICKERMAN.

202. BACTERIAL PHYSIOLOGY.—Lectures, literature reviews, and laboratory exercises in bacterial nutrition, metabolism and growth. The course includes a comprehensive survey of the nutritional requirements of bacteria, their enzyme systems and the chemical changes in substrates that result from enzyme action, and the resulting effect on bacterial growth. Credit, 3-5.
THE STAFF.

203. BACTERIAL CYTOLOGY.—Lectures, literature reviews, and laboratory demonstrations, designed to give the student a comprehensive survey of the structure of bacterial cells and the functions of their components. Attention will be given to bacterial mutations. Credit, 3-5.
Mr. FULLER.

204. ADVANCED STUDIES OF SPECIAL BACTERIAL GROUPS.—This course is designed to consider bacterial groups that are not considered, or are given limited attention in other courses offered by the department. Special attention will be given to the autotropical bacteria, such as nitrifying and nitrogen-fixing bacteria, as well as the sulfur and iron bacteria. The ecological relationships of bacterial associations will be included. The course will consist of lectures, literature reviews, and laboratory demonstrations. Credit, 3-5.
Mr. FULLER.

205. **ADVANCED IMMUNOLOGY.**—Consideration will be given to advanced theories and laboratory procedures basic to bacteriology, immunology, and serology.

Credit, 3-6.

Prerequisite, Bacteriology 185.

MISS GARVEY.

206. **INDUSTRIAL BACTERIOLOGY.**—Deals with various industrial processes involving bacterial changes. Specific organisms involved, procedure, chemistry of changes are discussed.

Credit, 3.

Mr. LIPOVSKY.

207. **VIROLOGY.**—A comprehensive study of viruses, including laboratory work covering methods for cultivation and identification. Limited to department majors, except by permission of the instructor.

Credit, 3.

Mr. DICKERMAN.

208. **SEMINAR.**—Lectures and reports on current literature and special topics. (One each semester.)

Credit, 1-4.

Mr. DICKERMAN and Mr. FULLER.

209. **SPECIAL PROBLEMS.**—This course is designed especially to provide research experience for students who do not write a thesis. The problem will be carried out in the same manner as a thesis, except that it will be less extensive. A written report of the completed study will be required. A student who is working a thesis may elect this course for special studies not otherwise provided for in the curriculum.

Credit, 3-6.

THE STAFF.

211. **ADVANCED BACTERIOLOGY.**—For students majoring in other departments, not for bacteriology majors. Lectures and laboratory. A systematic study of pathogenic and non-pathogenic bacteria, disinfectants and anti-biotics.

Prerequisite, Bact. 210.

Credit, 3.

Mr. LIPOVSKY.

300. **THESIS.**

Credit, 10-30.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181. **GENERAL APPLIED BACTERIOLOGY.**—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air.

Credit, 4.

Prerequisite, Bact. 31, 31A, or permission of instructor.

Mr. FRANCE.

182. **FOOD BACTERIOLOGY.**—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation, and spoilage of foods, (2) the sanitary examination of foods, (3) the causes of food poisoning and (4) microbiological assays.

Credit, 3.

Prerequisite, Bact. 51, or permission of instructor.

Miss GARVEY.

185. **IMMUNOLOGY.**—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quantitative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups.

Credit, 3.

Miss GARVEY.

190. SANITARY BACTERIOLOGY.—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies. By permission of instructor.

Credit, 3.

Mr. FRANCE.

192. CLINICAL LABORATORY METHODS.—This course is designated for students majoring in medical technology. The purpose of the course is to familiarize the student with routine clinical laboratory procedures.

Credit, 3.

By permission of instructor.

Mr. FRANCE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Public Health 164. MICROSCOPY OF WATER.

Credit, 3.

Mr. SNOW.

Home Economics 203. ADVANCED NUTRITION—METABOLISM OF MAJOR FOOD-STUFFS.

Credit, 3.

Miss MITCHELL.

Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.

Credit, 3.

Miss MITCHELL.

Home Economics 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.

Credit, 3.

Mrs. WERTZ.

Chemistry 234. ADVANCED BIOCHEMICAL LECTURES.

Credit, 3.

Mr. TURNER.

Chemistry 235. BIOCHEMISTRY LABORATORY METHODS.

Credit, 3-5 each semester.

Mr. TURNER.

Chemistry 236. ADVANCED BIOCHEMICAL ANALYSIS.

Credit, 3-5.

Mr. TURNER.

Chemistry 237. BIOCOLLOIDS.

Credit, 3.

Mr. TURNER.

Food Technology 210, 211. THERMAL PROCESSING OF FOODS.

Credit, 2, 1st semester.

Credit, 3, 2nd semester.

Mr. ESSELEN.

Food Technology 271, 272. SEMINAR.

Credit, 1-2 each semester.

THE STAFF.

COURSES FOR MINOR CREDIT ONLY

151, 152. ADVANCED BACTERIOLOGY.—Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The differentiation and identification of bacterial species by morphological, cultural, physiological, and serological studies. The combined courses not only give the students a comprehensive picture of the various forms of existing bacteria, but develop a special technique for the isolation, cultivation, and identification of both pathogenic and non-pathogenic species.

Credit, 3 each semester.

By permission of instructor.

Miss GARVEY.

210. ADVANCED AND APPLIED TECHNIQUES IN BACTERIOLOGY.—Lectures and laboratory. The material offered in this course is designed to help fill in the

student's general knowledge of the biological sciences. Emphasis will be placed **on the position of bacteria** in relation to other fields of science and on techniques that make it possible for the student to use bacteriology as a tool in his particular major field.

Credit, 3.

Mr. LIPOVSKY.

Botany

THEODORE T. KOZLOWSKI, major adviser

A thesis will be required of certain candidates for the M.S. in Botany.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200, 201. **SPECIAL PROBLEMS.**—Selected research problems in botany not related to the candidate's thesis. Credit, 1-5 per semester.

A. Plant Ecology. Mr. LIVINGSTON and Mr. HODGE.

B. Plant Mycology. Mr. BANFIELD, Mr. GUBA, and Mr. AMES.

C. Plant Morphology. Mr. TORREY.

D. Plant Pathology. Mr. BANFIELD, Mr. DORAN, Mr. GUBA, Mr. AMES.

E. Plant Physiology. Mr. KOZLOWSKI, Mr. JONES.

F. Plant Taxonomy. Mr. HODGE, Mr. TORREY, Mr. LIVINGSTON.

202, 203. **ADVANCED PLANT PHYSIOLOGY.**—Advanced study on metabolism, water relations and mineral nutrition of plants. The course includes lectures, critical analyses of literature, reports and individual conferences. Given in alternate years. Credit, 4 each semester.

Mr. KOZLOWSKI.

Prerequisites, Botany 167, 158 or equivalent,
Chemistry 151, 152 or equivalent.

204. **FOREST PATHOLOGY.**—A course dealing with the more common and important fungus diseases and with wood decay caused by saprophytic fungi which affect forest trees. Given in alternate years. Credit, 4.

Prerequisite, Botany 51 or equivalent. Mr. BANFIELD.

205, 206.—**ADVANCED PLANT PATHOLOGY.**—A study of biological problems that underlie the diseased state. Consideration is given to the general parasitological and epidermological aspects of plant disease from the standpoint of critical examination of the variation in and interaction between host plants, parasites and environment. Given in alternate years. Credit, 2-4 each semester.

Prerequisites, Botany 51 and 166 or equivalent. Mr. BANFIELD.

207. **ADVANCED PLANT ECOLOGY.**—Lectures, conferences, critical reading and reports on advanced considerations of synecology and autecology. Given in alternate years. Credit, 3.

Mr. LIVINGSTON.

300. **THESIS.**—Research on an approved problem in plant ecology, morphology, pathology, physiology or taxonomy. Credit, 10-30.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

158. **MICROTECHNIQUE.**—The preparation of microscopic mounts including the use of biological stains with the infiltration, celloidin and paraffin methods, and the use of slide and rotary microtomes. The rewards of careful work are improvement in manipulative technique, better orientation in the field of plant

structures, an enhanced aesthetic appreciation and a valuable collection of microscopic mounts.
Credit, 2.

Mr. TORREY.

159, 160. THE ANGIOSPERMS. A study of the angiosperm orders from the standpoint of reproductive morphology, ecology, evolution, economics and history. Illustrative types are drawn from the State herbarium, while forms for laboratory dissection are supplied from greenhouses or from preserved materials. A course for horticulturalists as well as botanists. Given in alternate years, beginning, 1952-53.
Credit, 3-5 each semester.

Mr. TORREY.

161, 162. COMPARATIVE ANATOMY OF GREEN PLANTS.—The anatomy, evolution, and taxonomy of chlorophyllous plants, including extinct as well as living forms. Lectures interpret anatomical data in accord with such principles as algal tendencies and parallelisms, isomorphic and heteromorphic alternation, the landward migration, telome concept, rise and development of atracheates and tracheates, stelar evolution and wood anatomy, angiosperms as the ultimate evolutionary types. Given in alternate years, beginning 1951-52.
Prerequisite, one semester of cryptogamic botany.
Credit, 3 each semester.

Mr. TORREY.

163, 164. COMPARATIVE MORPHOLOGY OF FUNGI.—Comparative morphology, life history and habitat of representative species of important orders and families. Laboratory work includes collection, identification, and study of common local forms.
Credit, 3 each semester.

Mr. BANFIELD.

166. GENERAL MYCOLOGY.—A general course designed to acquaint the student with various classes of fungi, life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, and their utilization and industrial fermentations.
Credit, 3.

Mr. BANFIELD.

167, 168. INTRODUCTORY PLANT PHYSIOLOGY.—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth.
Credit, 3 each semester.

Mr. KOZLOWSKI.

175. METHODS IN PLANT PATHOLOGY.—A study of general techniques and specialized methods used in the investigation of plant diseases. Given in alternate years.
Credit, 3.

Prerequisite, one semester of plant pathology.

Mr. BANFIELD.

181. PLANT ECOLOGY.—The relationships of plants to environment including a study of environmental factors (autecology) and of plant communities (synecology).
Credit, 3.

Mr. LIVINGSTON.

182. PLANT GEOGRAPHY.—Lectures and assigned readings of descriptive and historical plant geography as well as basic principles governing the natural distribution of plants.
Credit, 2.

Mr. HODGE.

188. PLANT CYTOGENETICS.—The interpretation of hereditary phenomena in plants in terms of cell structures. A correlation of plant cytology and genetics which is of applied as well as theoretical importance.
Credit, 3.
Prerequisite, Zoology 153.

Mr. SPENCER.

190. INSECT TRANSMISSION OF PLANT DISEASES.—A lecture course on intricate interrelationships of insects and microorganisms, with particular emphasis

on the basic role played by insects in inception, distribution and perpetuation of plant diseases.

Credit, 3.
Mr. BANFIELD.

Chemistry

WALTER S. RITCHIE, major adviser.

The Department of Chemistry provides facilities for students intending to complete the requirements for the Master's degree and the Doctor's degree. Students accepted for graduate study are expected to have met the usual requirements for the Bachelor's degree. Those who have not fulfilled these requirements may be admitted on limited status until the deficiencies have been removed.

First year graduate students will take "placement" examinations during the first week of residence. These examinations are for the purpose of evaluating the background of the student, and to assist in the selection of a course of study. Students are admitted to candidacy for a degree only after the satisfactory passing of written comprehensive examinations, at which time thesis problems are assigned in the following fields of chemistry: physical, organic, inorganic, analytical and biochemical.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. INORGANIC PREPARATIONS.—LABORATORY.—The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone.

Credit, 3-5.

Mr. SMITH.

202. INORGANIC CHEMISTRY OF THE LESS FAMILIAR ELEMENTS.—Lectures and collateral reading on the descriptive chemistry of some of the less common elements such as boron, gallium, indium, thallium, the lanthanides, fluorine, titanium, vanadium, tantalum, tungsten, and uranium. Correlations between structure or spatial configurations and chemical properties will be stressed to the extent permitted by modern data. Given in alternate years.

Credit, 3.

Mr. ROBERTS.

203. PHYSICAL CHEMICAL MEASUREMENTS.—Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; percent hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; absorption of iodine by charcoal; determination of hydrogen ion concentration. To each student separate work will be assigned.

Credit, 3-5 each semester.

Prerequisites, Chemistry 165 and 166.

Mr. FESSENDEN and Mr. SMITH.

205. CHEMICAL THERMODYNAMICS.—The first and second laws of thermodynamics will be reviewed. The concept of the Boltzmann distribution and the partition function will be introduced, and the calculation of thermodynamic function from these quantities will be discussed. The calculation of equilibrium constants from both thermochemical and spectroscopic data will be considered, as will the application to electrochemistry and ionic equilibria.

Credit, 3.

Prerequisites, Chemistry 165 and 166.

Mr. STEIN.

206. GASES, KINETICS, AND CATALYSIS.—Some of the basic concepts of the kinetic theory of gases and the absorption of gases by solids will be discussed. The kinetics of homogeneous gas reactions and chain reactions will be considered as well as the theory of absolute reaction rates. Homogeneous and heterogeneous catalysis, photochemical, radiation induced reactions, and reactions in solution will be discussed.

Credit, 3.

Prerequisite, Chemistry 205 or its equivalent.

Mr. STEIN.

208. CHEMICAL SPECTROSCOPY.—This course is designed to give students practice in the use of spectroscopic equipment in solving chemical problems. The lecture work of the course will include discussions of (1) the design and use of instruments, (2) the elementary theory of spectra, and (3) the application of spectroscopy of chemical problems. The laboratory work will include practice in the use of the spectrometer and the spectrograph for the analysis of flame, arc, and spark spectra, and the use of the spectrophotometer for absorption measurements. Photographic procedures will be discussed and used in connection with the operation of the spectrograph. Given in alternate years. Credit, 3.

Prerequisites, Chemistry 165 and 166, or equivalent.

Mr. SMITH.

210. ATOMIC AND MOLECULAR THEORY.—A consideration of the fundamental particles, natural and induced radioactivity, atomic theory based upon atomic spectra and the quantum theory, the nature of chemical binding and molecular theory. Given in alternate years.

Credit, 3.

Prerequisites, Chemistry 165, 166, 185, or equivalent.

Mr. SMITH.

221. ADVANCED ANALYTICAL CHEMISTRY.—Laboratory consisting of special work to meet the needs of the individual student. It may consist of ultimate analysis, electro-analysis, the analysis of definite classes of materials such as fertilizers, ores, insecticides, alloy or materials containing the rarer elements, and the use of organic reagents.

Credit, 3-5 each semester.

Mr. ROBERTS.

223. INTRODUCTION TO MICRO-CHEMISTRY.—Laboratory. Designed to illustrate the applications of micro technique to synthesis, analysis, and characterization. The microscopic work will include the optics of the microscope, micrometry, the microscopic study of fibers, crystals, and physiochemical phenomena and an introduction to microscopical qualitative analysis. The quantitative work will include the determination of carbon, hydrogen, nitrogen, and halogen in organic materials and selected inorganic determinations.

Credit, 3-5 each semester.

Prerequisites, Chemistry 166, 130, 183, or equivalent.

Mr. ROBERTS.

229, 230. THEORETICAL ORGANIC CHEMISTRY.—Lectures on special topics such as stereochemistry, bond formation, resonance, ionic reactions, free radical reactions, transition state theory, reaction mechanisms, molecular rearrangements, etc. Given in alternate years.

Credit, 3 each semester.

Prerequisite, Chemistry 181 or its equivalent. Mr. CANNON and Mr. PIERCE. Chemistry 181 may be taken simultaneously with Chemistry 229.

231. ADVANCED ORGANIC CHEMISTRY.—Laboratory. More difficult synthesis of organic compounds will be assigned to the individual student. These compounds will frequently be those desired as starting materials for research. Their preparation will require the use of the original literature.

Credits, 3-5.

Prerequisite, a year course in Organic Chemistry. Mr. CANNON and Mr. RITCHIE.

232. ORGANIC CHEMISTRY.—An intensive survey of certain reactions of organic chemistry with emphasis on their scope and limitations, recent developments, and theoretical aspects. Given every other year, alternating with Chemistry 230.

Credit, 3.

Prerequisite, Chemistry 181.

Mr. CANNON.

234. **ADVANCED BIOCHEMICAL LECTURES.**—Lectures on recent developments in the chemistry of proteins, lipids, carbohydrates, enzymes, and other materials of biological significance. The organic chemistry supporting the several major fields of applied biology will be emphasized.

Credit, 3.

Mr. TURNER.

235. **BIOCHEMISTRY LABORATORY METHODS.**—Advanced laboratory work on preparation, examination, and analytical techniques for protein, carbohydrate, lipids, enzymes, etc. Methods of colloid chemistry will be included. Individual problems and work will be assigned as far as possible to meet individual requirements.

Credit, 3-5 each semester.

Mr. TURNER.

236. **ADVANCED BIOCHEMICAL ANALYSIS.**—Advanced laboratory course in analytical methods applicable to naturally occurring materials including foods, feeds, etc. Research methods and techniques will be introduced as well as routine methods.

Credit, 3-5.

Mr. TURNER.

237. **BIOCOLLOIDS.**—An introduction to the principles of surface chemistry that apply to colloid systems. Major consideration given to the emulsions and hydrophilic systems encountered in fields of applied biology. Collateral reading and preparation of literature reviews in the student's special field necessary.

Credit, 3.

Mr. TURNER.

239. **CHEMISTRY OF NATURAL PRODUCTS.**—The lectures and collateral readings will deal with the chemistry of some classes of natural compounds which are of biochemical and economic interest. Proteins, the sugars, starch, cellulose, polyuronides, lignin, glucosides, alkaloids, enzymes, purines, pyrimidines, and pigments will be considered.

Credit, 2.

Mr. TURNER.

251. **SEMINAR.**—Conferences, reports, or lectures.

Credit, 1 each semester.

Maximum credit, 2.

Mr. RITCHIE.

300. **THESIS.**—Research, and in the case of a degree, the preparation of an acceptable thesis in agricultural, analytical, inorganic, organic, physiological, or physical chemistry, under the direction of the professor in charge of the work.

Credit, 10-30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

177. **ADVANCED PHYSICAL CHEMISTRY.**—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry. Three class hours.

Credit, 3.

Mr. STEIN.

Prerequisites, Chemistry 165 and 166.

181. **ORGANIC CHEMISTRY.**—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects.

Credit, 3.

Three class hours.

Mr. CANNON.

182. **QUALITATIVE ORGANIC CHEMISTRY.**—The characterization of organic compounds by means of physical properties, class reactions, and the preparation of suitable derivatives.

Credit, 4.

Two class hours; two 3-hour laboratory periods.

Mr. CANNON.

183. **ADVANCED QUANTITATIVE ANALYSIS.**—The laboratory work will include representative determinations in electrolytic and electrometric methods, and an introduction to colorimetry and other optical methods of analysis. Credit, 3.
Two class hours; one 3-hour laboratory period. Mr. ROBERTS.
Prerequisite, Chemistry 130.

186. **THEORETICAL INORGANIC CHEMISTRY.**—Atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table. Credit, 3.
Three class hours. Mr. SMITH.
Prerequisite, Chemistry 165.

188. **HISTORY OF CHEMISTRY.**—An historical and biographical study of chemistry and chemists. Credit, 3.
Three class hours. Mr. RITCHIE.

192. **INTRODUCTION RESEARCH.**—Admission only by permission of the department. Credit, 5.
10 laboratory periods. THE STAFF.
Hours by arrangement.

193, 194. **GENERAL BIOCHEMISTRY.**—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences and provide a background for more advanced or specialized study in this field. A competent preparation in organic chemistry is required. (Chemistry 51 and 52 or their equivalent.) Credit, 5 each semester.
Three class hours; two 3-hour laboratory periods. Mr. TURNER.

COURSES FOR MINOR CREDIT ONLY

(For chemistry majors)

151, 152. **ORGANIC CHEMISTRY.**—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those who may specialize in other fields. Credit, 4.
Three class hours; one 3-hour laboratory period.

Mr. RITCHIE and Mr. CANNON.

163. **CHEMISTRY OF WATER, SEWAGE, AND SEWAGE SLUDGE.**—The preparation of reagents and standard methods for the analysis of water, sewage, and sewage sludge. Credit, 3.
Two 3-hour laboratory periods. Mr. ———.
Prerequisite, Chemistry 30.

165, 166. **PHYSICAL CHEMISTRY.**—A study of the fundamental theories and laws of physical chemistry. Credit, 4.
Three class hours; one 3-hour laboratory period.

Mr. FESSENDEN and Mr. SMITH.

179. **BIOCHEMISTRY.**—An introduction to general biochemistry and physiological chemistry, with particular emphasis on the extension of fundamental organic chemistry to materials and processes of biological significance; proteins, lipids, carbohydrates, enzymes. Credit, 4.
Three class hours; one 3-hour laboratory period. Mr. TURNER.
Prerequisite, Organic Chemistry.

180. **CLINICAL CHEMISTRY.**—(Blood and Urine Analysis). The collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of

certain significant compounds in the samples. The latter group will include at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

One class hour; two 2-hour laboratory periods.

Credit, 3.
Mr. TURNER.

Civil Engineering

MERIT P. WHITE, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

261. MATERIALS TESTING TECHNIQUES.—This course is concerned with the machines and auxiliary equipment used in experimental stress analysis for purposes of research.

Prerequisite, C.E. 51.

Credit, 3.

Mr. COFFEY.

270. ADVANCED STRUCTURAL THEORY II.—Advanced problems in structural analysis are presented in this course. Topics considered are the analysis of complex rigid frames and of arches; influence lines for indeterminate structures; the placing of loading and the determination of stress in continuous building frames; secondary stresses; and limit design.

Prerequisite, C.E. 172.

Credit, 3.

Mr. OSGOOD.

275. ADVANCED FLUID MECHANICS I.—Theory of hydraulic similtude, dimensional analysis, methods of obtaining dynamic similarity in hydraulic models in actual practice, analysis of typical hydraulic models.

Prerequisite, C.E. 75 or 76.

Credit 3.

Mr. CARVER.

276. ADVANCED FLUID MECHANICS II.—Review of basic open channel flow formulae geometric properties of various channel sections, basic theory of turbulence and boundary layer phenomena, velocity distribution in pipes and open channels, specific energy and the hydraulic pump, design of channel transitions in supercritical flow, backwater curves.

Prerequisite, C.E. 75 or 76.

Credit, 3.

Mr. CARVER.

277. ADVANCED SANITARY ENGINEERING I.—This course treats problems encountered in the design and operation of water supply and sewage disposal systems.

Prerequisite, C.E. 77, 78.

Credit, 3.

Mr. ANDERSON.

278. A continuation of C.E. 277.

Prerequisite, C.E. 277.

Credit, 3.

Mr. ANDERSON.

279. THEORETICAL SOIL MECHANICS.—A thorough investigation of the phenomena in soil masses subjected to such forces as seepage, frost, and imposed loads.

Prerequisite, C.E. 279.

Credit, 3.

Mr. HENDRICKSON.

280. APPLIED SOIL MECHANICS.—The solution of case problems applying the principles of soil mechanics to the design of embankments, retaining walls, footings, raft foundations, and pile structures.

Prerequisite, C.E. 279.

Credit, 3.

Mr. HENDRICKSON.

300. RESEARCH AND THESIS.

Credit, 6.

THE STAFF,

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

172. **ADVANCED STRUCTURAL THEORY I.**—Methods of analyzing statistically indeterminate structures. Credit, 3.
Prerequisite, C.E. 70. Mr. OSGOOD.

188. **ADVANCED STRESS ANALYSIS.**—Determination of stresses and strains in elements of machines and structures. Credit, 3.
Prerequisite, C.E. 51 with grade of 80. Mr. WHITE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

M.E. 172. **FUNDAMENTALS OF METALLURGY.** Credit, 3.
Mr. KEYSER.

M.E. 185. **DYNAMICS OF MACHINERY.** Credit, 3.
Mr. WOLOWICZ.

E.E. 201, 202. **ENGINEERING ANALYSIS. I, II.** Credit, 3 each semester.
Mr. ROYS and STAFF.

Dairy Industry

D. J. HANKINSON, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. **PROBLEMS IN DAIRY TECHNOLOGY.**—A course for individual study in which the student gives attention to specific current problems involved in the processing of dairy products. Credit, 3.
Mr. HANKINSON.

202. **ADVANCED DAIRY CHEMISTRY.**—A study of the physical, colloidal, and chemical properties of dairy products; the role of milk fat, salts, proteins, carbohydrates, and enzyme systems, and their relation to dairy research. Credit, 3.
Two 1-hour lectures, one 3-hour laboratory period. Mr. NELSON.
Prerequisite, 175 or equivalent.

209, 210. **SEMINAR.**—Reports on current literature. Credit, 1 each semester.
Mr. HANKINSON.

300. **THESIS.** Credit, 10.
THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

175. **DAIRY CHEMISTRY.**—Physical and chemical principles which explain the behavior of milk and milk products in the various technological operations. Constituents of milk in relation to other organic compounds; physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc. The laboratory work will include many of the tests used commercially as well as in

dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus. Credit, 3.

Enrollment by permission of instructor.

Mr. NELSON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

No more than two courses may be selected from the following list of courses:

Home Economics 203. ADVANCED NUTRITION.—Metabolism of major food-stuffs. Credit, 3.

Miss MITCHELL.

Home Economics 204. ADVANCED NUTRITION.—Minerals and vitamins.

Credit, 3.

Miss MITCHELL.

Bacteriology 202. BACTERIAL PHYSIOLOGY.

Credit, 3-5.

THE STAFF.

Chemistry 165, 166. PHYSICAL CHEMISTRY.

Credit, 4 each semester.

Mr. FESSENDEN and Mr. SMITH.

Chemistry 193, 194. GENERAL BIOCHEMISTRY.

Credit, 5 each semester.

Mr. TURNER.

Chemistry 237. BIOLLOIDS.

Credit, 3.

Mr. TURNER.

Food Technology 210. THERMAL PROCESSING OF FOODS.

Credit, 2.

Mr. ESSELEN.

Food Technology 221. EDIBLE FATS AND OILS.

Credit, 3.

Mr. ANDERSON.

COURSES FOR MINOR CREDIT ONLY

152. MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization, and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value and advertising. Cultured milk and other milk drinks are also included. Some milk plants are visited. Credit, 4.

Mr. LINDQUIST.

177. BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of started cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage, processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein are also covered. Credit, 4.

Prerequisite, Dairy 25 or permission of instructor.

Mr. LINDQUIST, Mr. NELSON, and Mr. FINNEGAN.

178. ICE CREAM MAKING.—The principles and practices of ice cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished product are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some

time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry. Credit, 4.
Prerequisite, Dairy 25 or permission of instructor. Mr. NELSON.

Economics

PHILIP L. GAMBLE, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

210. HISTORY OF ECONOMIC THOUGHT.—A general study of economic thought from its ancient beginnings; the contributions of the various schools; recent changes in economic thought. Given as required. Credit, 3.

Mr. HALLER.

213. CENTRAL BANKING.—A study of the organization and policies of the major central banks with special reference to the Federal Reserve System. Given as required. Credit, 3.

Mr. GAMBLE.

260. MONOPOLY AND PUBLIC UTILITY PROBLEMS.—A study of the problem of social control of monopolies and industries affected with a public interest. Given as required. Credit, 3.

Prerequisite, Economics 170.

Mr. HALLER.

272. ADVANCED ECONOMIC THEORY.—A study of the various theories of value and distribution. Credit, 3.

Prerequisite, Economics 173.

Mr. SIEVERS.

285, 286. SPECIAL STUDIES IN ECONOMICS.—The student undertakes a special project under the guidance of a member of the department.

Credit, 2-5 each semester.

THE STAFF.

293, 295, 297. COURSES IN AGGREGATIVE ECONOMICS.—(These courses rotate but not in a consistent cycle.)

293. ECONOMIC PLANNING.—Various economic plans in effect or proposed throughout the world. Appraisal of the technique of economic planning.

Credit, 3.

Mr. MORRIS.

295. FULL EMPLOYMENT.—Methods of attaining and maintaining full employment in economy.

Credit, 3.

Mr. MORRIS.

297. ECONOMIC FLUCTUATIONS.—Causes, and methods of control of economic fluctuations.

Credit, 3.

Mr. KIMBALL.

294. INSTITUTIONAL ECONOMICS.—Study of the major institutions affecting economic problems. Given as required.

Credit, 3.

Mr. DYMOND.

300. THESIS.

Credit, 10-30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

Added work required of graduates: (a) extra readings on same or additional assignments, (b) term paper, (c) special problem or project.

155. **ECONOMICS OF CONSUMPTION.**—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes. Credit, 3.

(a and b or c)

Mr. HALLER.

156. **BUSINESS CYCLES.**—A study of business fluctuations and an analysis of current business cycle theories. Credit, 3.

(a, c)

Mr. KIMBALL.

165. **CORPORATION FINANCE.**—An introductory course in business finance concerned with forms of ownership organization, the nature and uses of corporate securities, provision and maintenance of capital, financial expansion, and corporate reorganization. Credit, 3.

(a, c)

Mr. KIMBALL.

170. **MONOPOLIES.**—A study of the growth, development and social control of monopolies. Credit, 3.

(a, b)

Mr. HALLER.

174. **CURRENT ECONOMIC PROBLEMS.**—An intensive study of current economic problems. Students will be encouraged to pursue lines of individual interest. Credit, 3.

(a, b)

Mr. DYMOND.

177. **INTERNATIONAL TRADE.**—A study of the policies, principles, and practices of international trade. Credit, 3.

(a, b)

Mr. DONALD.

178. **PUBLIC FINANCE.**—A study of the principles underlying public expenditures, public borrowing and taxation. Credit, 3.

(a, b)

Mr. GAMBLE.

180. **LABOR LEGISLATION.**—A study of federal and state legislation affecting labor. Credit, 3.

(a, b)

Mr. MORRIS.

183. **SOCIAL CONTROL OF BUSINESS.**—Methods of social control of economic activity including both formal and informal controls. Credit, 3.

(a, b)

Mr. DONALD.

184. **COMPARATIVE ECONOMIC SYSTEMS.**—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economics. Credit, 3.

(a, b)

Mr. SIEVERS.

191, 192. **SEMINAR.**

Credit, 1-3.

THE STAFF.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

- Agricultural Economics 204. RESEARCH METHODS AND PROCEDURES. Credit, 3.
Mr. LINDSEY.
- Agricultural Economics 156. FUNDAMENTALS OF COOPERATION. Credit 3.
Mr. LINDSEY.
- Agricultural Economics 171. AGRICULTURAL ECONOMIC THEORY. Credit, 3.
Mr. LINDSEY.
- Agricultural Economics 178. PRINCIPLES AND PROBLEMS OF LAND ECONOMICS. Credit, 3.
Mr. LINDSEY.
- Agricultural Economics 180. ADVANCED STATISTICS. Credit, 3.
Mr. LINDSEY and Mr. RUSSELL.
- Agricultural Economics 189, 190. PROBLEMS IN AGRICULTURAL ECONOMICS. Credit, 2-3.
Mr. LINDSEY and Mr. RUSSELL.

COURSES FOR MINOR CREDIT ONLY

225. APPLIED ECONOMICS.—A course offered primarily for high school teachers (others may elect), which is intended to appraise such current economic questions as the business cycle, taxation, banking, international trade reparations, economic planning, and similar problems in the light of economic principles. Credit, 3.
Mr. GAMBLE.
153. MONEY, BANKING AND CREDIT.—A critical survey of the development and operation of the monetary and banking systems of the United States. Credit, 3.
(a) Mr. GAMBLE.
173. MODERN ECONOMIC THEORY.—A study of current theories about value, distribution and prices. Credit, 3.
(c) Mr. SIEVERS.
179. LABOR PROBLEMS.—An analysis of the background and character of the modern labor problem with special references to the United States. Credit, 3.
(a and b or c) Mr. MORRIS.

Education

ALBERT W. PURVIS, major adviser.

Before being admitted to full status for the Master's degree with a major in Education, the student must have, in addition to minimum Graduate School requirements:

1. Fifteen hours of such fundamental courses as Education 51, 52, 53, 72, 83, 85, etc., listed in the undergraduate catalogue.
2. Experience in teaching. Students entering without teaching experience must arrange for practice teaching as soon as possible.
3. If the major is in secondary education, two majors (18 hours each) or one major and two minors (12 hours each) in the subject-matter fields to be taught.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

208. THE TEACHER AND SCHOOL ADMINISTRATION.—Problems in admission, promotion, personnel, discipline, extra-curricular activities, supervision, tenure, salary schedules, etc.

Credit, 2-3.

Mr. PURVIS.

209. ADMINISTERING SECONDARY SCHOOLS.—Housing, finance, schedule, the library, guidance, cafeteria, public relations. etc.

Credit, 2-3.

Mr. OLIVER.

210. ADMINISTERING EXTRA-CURRICULAR ACTIVITIES.—Scheduling, financing, sponsorship, regulation of pupil participation.

Credit, 2-3.

Mr. OLIVER.

213. ADMINISTERING ELEMENTARY SCHOOLS.—The principal's responsibilities, organization of the school office, scheduling, use of school facilities, curriculum organization, staff relationships, and the place of the school in the community.

Credit, 2-3.

Mr. MCCARTHY.

214. SUPERVISING ELEMENTARY SCHOOLS.—Principles and problems of supervision in the elementary school; methods and types of supervision as they are related to the modern elementary curriculum, the content fields, the activity program and the area of unitary teaching.

Credit, 2-3.

Mr. MCCARTHY.

220. SCHOOL LAWS OF MASSACHUSETTS.—A review of the legal relations of the school personnel covering the usual experiences in school and community, presented in a series of selected cases having the support of court decisions.

Credit, 3.

Mr. PURVIS.

267. AUDIO-VISUAL LABORATORY.—Individual and practical experience in setting up and using common Audio-Visual equipment and materials. Minor repairs and maintenance will be included. This course should be preceded by Education 166 or a similar course.

Credit, 2-3.

Mr. WYMAN.

291. EDUCATIONAL RESEARCH AND STATISTICS.—The principles and methods of research with special emphasis upon the technique used in Education. Statistics are studied chiefly from the standpoint of reporting and understanding the results of research. Required in first semester of students who anticipate completion of a thesis or problem in the current year.

Credit, 2.

Mr. PURVIS.

299. PROBLEM.—Work necessary to achieve an answer to a particular question in the educational field. Question to be of student's choosing, if possible. It may or may not involve original research and usually has only local significance. This may be chosen instead of a thesis. A bound copy of the written report must be provided for the Department by the student.

Credit, 3-6.

Prerequisite, Education 291.

THE STAFF.

300. THESIS.—A completed piece of work on some specific aspect of the educational field with necessary review of the literature pertaining to it. Original research is expected and the study should have more than local significance.

Credit, 8.

Prerequisite, Education 291.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For major or minor credit)

151. HISTORY OF EDUCATION. Credit, 2-3.
Mr. PURVIS.
153. EDUCATIONAL TESTS AND MEASUREMENTS. Credit, 2-3.
Mr. ROURKE.
166. PREPARATION AND USE OF AUDIO-VISUAL AIDS. Credit, 2-3.
Mr. WYMAN.
160. ELEMENTARY SCHOOL CURRICULUM.—The elementary curriculum from the point of view of content and methodology. Emphasis will be placed on the unit method and the activity program. Credit, 2-3.
Mr. _____
161. ELEMENTARY READING AND LANGUAGE ARTS.—Guidance in attacking problems of reading and language arts in the elementary grades. Emerging methods of preventing and remedying reading difficulties will be discussed. Attention will be given to the purposes, methods and materials of oral and written language and reading. Credit, 2-3.
Mr. _____
162. ELEMENTARY ARITHMETIC AND SCIENCE.—Methods and materials in these subjects in the elementary schools and ways of integrating them into the activity program. Credit, 2-3.
Mr. _____
163. PRINCIPLES OF ELEMENTARY EDUCATION.—Aims, organization, program, pupil population, etc., of the elementary school and its relationship to the secondary school. Credit, 2-3.
Mr. _____
172. VOCATIONAL EDUCATION IN AGRICULTURE.—By arrangement. Credit, 3.
Mr. OLIVER and Mr. TAFT.
173. APPRENTICE TEACHING IN AGRICULTURE.—One full year of teaching vocational agriculture off campus. By arrangement. Credit, 6.
Mr. OLIVER and Mr. TAFT.
175. TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE. By arrangement. Credit, 3.
Mr. OLIVER and Mr. TAFT.
188. SECONDARY SCHOOL CURRICULUM. Credit, 2-3.
Mr. ROURKE.

COURSES FOR MINOR CREDIT ONLY.

152. PRINCIPLES AND METHODS OF TEACHING. Credit, 3.
Mr. MCCARTHY.
185. OBSERVATION AND PRACTICE TEACHING. By arrangement. Credit, 3.
THE STAFF.

Electrical Engineering

ROBERT R. BROWN, major adviser.

POWER OPTION

First Semester

Second Semester

REQUIRED COURSES

E.E. 201. ENGINEERING ANALYSIS I.	E.E. 202. ENGINEERING ANALYSIS II.
E.E. 221. POWER AND MACHINERY LABORATORY.	E.E. 222. POWER SYSTEMS METERING AND RELAYING.
E.E. 300. GRADUATE RESEARCH.	E.E. 300. GRADUATE RESEARCH.

ELECTIVES IN ELECTRICAL ENGINEERING

E.E. 191. SERVOMECHANISMS I.	E.E. 178. TRANSIENT ANALYSIS.
E.E. 223. TRAVELING WAVES.	E.E. 182. POWER APPLICATIONS.
	E.E. 184. INDUSTRIAL ELECTRONICS.
	E.E. 188. POWER DISTRIBUTION.
	E.E. 190. PUBLIC UTILITIES.
	E.E. 196. ELECTRICAL DESIGN.
	E.E. 204. SERVOMECHANISMS II.
	E.E. 224. POWER SYSTEMS OPERATION AND STABILITY.

ELECTRONICS AND COMMUNICATIONS OPTION

First Semester

Second Semester

REQUIRED COURSES

E.E. 201. ENGINEERING ANALYSIS I.	E.E. 202. ENGINEERING ANALYSIS II.
E.E. 241. COMMUNICATIONS NET- WORKS.	E.E. 242. VACUUM TUBE CIRCUITS.
E.E. 300. GRADUATE RESEARCH.	E.S. 300. GRADUATE RESEARCH.

ELECTIVES IN ELECTRICAL ENGINEERING

E.E. 191. SERVOMECHANISMS I.	E.E. 178. TRANSIENT ANALYSIS.
E.E. 243. ELECTROMAGNETIC ENGI- NEERING.	E.E. 184. INDUSTRIAL ELECTRONICS.
	E.E. 190. PUBLIC UTILITIES.
	E.E. 194. U.H.F. TECHNIQUES.
	E.E. 196. ELECTRICAL DESIGN.
	E.E. 198. TELEVISION.
	E.E. 246. ELECTROMECHANICAL SYS- TEMS.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. ENGINEERING ANALYSIS I.—Analytical procedure beyond undergraduate levels as applied to the solutions of problems in the various fields of engineering. Credit, 3.

Prerequisite, B.S. in engineering.

Mr. ROYS and STAFF.

202. ENGINEERING ANALYSIS II.—A continuation of 201.

Credit, 3.

Prerequisite, E.E. 201.

Mr. ROYS and STAFF.

204. SERVOMECHANISMS II.—A continuation of E.E. 191. that covers the principles of quantitative dynamic analyses of closed-cycle control systems in

terms of differential equations and complex functions. System synthesis on the basis of specified performance characteristics also is a major objective

Credit, 3.

Prerequisite, E.E. 191.

Mr. BROWN and Mr. JATRAS.

221. POWER AND MACHINERY LABORATORY.—This is designed to develop testing techniques through class and laboratory studies of the more advanced topics related to electrical machinery and power systems. When taken concurrently with other courses in power and machinery, the laboratory work may be varied to suit individual needs.

Credit, 3.

1 class hour; 6 hours of laboratory.

Mr. WILSON.

Prerequisite, E.E. 81.

222. POWER SYSTEMS METERING AND RELAYING.—This course covers metering and protective relaying for electric power systems, and includes modern relay methods used on radial lines, loops and networks, with emphasis upon co-ordinated protection; circuit interruption problems also are studied.

Credit, 3.

Prerequisite, E.E. 86.

Mr. BROWN.

223. TRAVELING WAVES IN POWER SYSTEMS.—The fundamental theory of traveling waves and its application to lightning and switching surges in power systems, including reflection and refraction at transition points; insulation levels and coordination; high voltage and current and voltage surge testing standards.

Credit, 3.

Mr. ROYS and Mr. WILSON.

224. POWER SYSTEMS OPERATION AND STABILITY.—A continuation of E.E. 86. with further applications to power systems under unbalanced steady state and transient conditions. This includes the effects of ground wires, ground impedance and mutual coupling impedances; inductive coordination with communication systems; the effects of saturation and pole saliency in synchronous machines upon steady state and transient stability; variability of load impedance; and multimachine problems.

Credit, 3.

Prerequisites, E.E. 86 and 223.

Mr. WILSON.

241. COMMUNICATIONS NETWORKS.—A continuation of E.E. 79. which includes the Foster Reactance Theorem, the matrices of four-terminal systems and the principles of network synthesis with emphasis upon physical realizability and stability. Applications are made to the analysis and design of filters, equalizers, feedback networks and to other frequency-responsive systems.

Credit, 3.

Prerequisite, E.E. 79.

Mr. ROYS.

242. VACUUM TUBE CIRCUITS.—A continuation of E.E. 80. consisting of the analysis and design of power and high frequency amplifiers and oscillators; the series expansion for plate current through impedance loads; high and low level modulation and detection; linear and square-law detection; multivibrators, trigger, clamping, computer and gate circuits; and square wave and pulse testing.

Credit, 3.

Mr. ROYS.

243. ELECTROMAGNETIC ENGINEERING I.—The fundamentals of Electromagnetism, including Ampere's and Faraday's Laws, Gauss' Theorem, retarded potential and Hertz' vector, Maxwell's equations and Poynting's vector. These are applied to the propagation, reflection and refraction of electromagnetic waves, radio-frequency lines, wave guides, cavity resonators, antennas and ionospheric reflections.

Credit, 3.

Prerequisite, E.E. 194.

Mr. ROYS.

246. ELECTROMECHANICAL SYSTEMS AND TRANSDUCERS.—A review of network theory as associated with lumped mechanical systems, vibrating membranes

and plates, electromechanical converters and acoustics. Applications are made to microphones, loudspeakers, horns, crystals and electromechanical filters.
Prerequisite, E.E. 178.

Credit, 3.
Mr. ROYS.

300. GRADUATE RESEARCH.—Independent research under the supervision of a staff member which will serve as the basis for the thesis required for the master's degree in Electrical Engineering. It is expected that a paper covering the project will be presented before the combined A.I.E.E. and I.R.E. student branch at the University.

Credit, 3-6.

Consultation and laboratory hours to be arranged.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

178. TRANSIENT ANALYSIS.—A study of the transient behavior of electrical, mechanical and thermal systems. This includes the formulation of the ordinary and partial differential equations of dynamic systems, and their solution by the classical and Heaviside methods and by Fourier and Laplace transforms.

Prerequisites, E.E. 51 and 57.

Credit, 3.

Mr. ROYS.

182. POWER APPLICATIONS IN INDUSTRY.—A study of industrial applications of electrical machines including power supplies to industrial plants, load requirements, types of drives, mechanical requirements of variable speed drives, torque relations in D-C and A-C motors, motor applications and control, and selsyn systems.

Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. WILSON.

Prerequisite, E.E. 81.

184. INDUSTRIAL ELECTRONICS.—Special characteristics of the electron tubes of industry; the theory, design and operation of commercial types of equipment utilizing these tubes, including stroboscopes, grid-controlled and polyphase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, etc.

Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. ROYS.

Prerequisite, E.E. 74.

188. ELECTRIC POWER DISTRIBUTION.—This course consists of a study of the particular problems relating to the distribution of electric power. Some of the topics considered are radial and loop systems, automatic load transfer, voltage regulation, and short circuit protection.

Credit, 3.

Prerequisite, E.E. 77.

Mr. WILSON.

190.—PUBLIC UTILITIES.—This course considers the organization, administration and economics of public utilities, with emphasis upon electric power companies; it includes financing, rate studies, power contracts, public service commission regulations and other related topics.

Credit, 3.

Mr. BROWN.

191. SERVOMECHANISMS I.—This is a study of basic types of error-sensitive control systems; proportional, differential and integral controllers; transient behavior; criteria for error-free operation; and practical electrical and mechanical systems. Classical methods of analysis will be employed.

Credit, 4.

3 class hours; one 3-hour laboratory period

Mr. BROWN.

Prerequisites, E.E. 57 or M. E. 185.

194. **ULTRA-HIGH-FREQUENCY TECHNIQUES.**—This course is a study of U.H.F. oscillators, amplifiers, transmitters, receivers, transmission systems and antennas; multi-vibrators, trigger and gate circuits, electronic switches and controls. 3 class hours; one 3-hour laboratory period.

Credit, 4.

Prerequisites, E.E. 57 and 77.

Mr. BROWN.

196. **PRINCIPLES OF ELECTRICAL DESIGN.**—The fundamentals of electric, dielectric, magnetic and heat-flow systems as applied to the design, rating and life of coils, transformers, machinery and other electrical equipment. Credit, 3.

2 class hours; one 3-hour laboratory period.

Mr. ROYS.

Prerequisite, E.E. 54.

198. **TELEVISION ENGINEERING.**—The application of Electronics and Radio Engineering to the special problems of Television. Among the topics considered are the fundamentals of scanning and bandwidth selection; noise limitations associated with primary and secondary emission; iconoscope, image orthocon, image-dissector and other types of pickup tubes; kinescopes; television transmitters, receivers and antennas. Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. LANGFORD and Mr. MARSH.

Prerequisites, E.E. 75 and 78.

English

FRANK P. RAND, major adviser.

Language requirement: the ability to translate, with the aid of a dictionary, two languages other than English.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. **OLD ENGLISH.**—A study of Old English grammar with prose translation. This (or 203.) required of all English majors. Given in alternate years, beginning 1952-53. Credit, 3.

Mr. LANE.

203. **MIDDLE ENGLISH.**—A study of the language of Chaucer and the mediaeval romances. This (or 201.) required of all English majors. Given in alternate years, beginning 1951-52. Credit, 3.

Mr. HELMING.

251. **SHAKESPEARE.**—A close study of *Henry 4—Part 1*, *Twelfth Night*, *King Lear*, and *Cymbeline*. Given in alternate years, beginning 1951-52.

Prerequisite, English 155.

Credit, 3.

Mr. TROY.

254. **CARLYLE.**—A comprehensive and intensive study of the life and writings of Thomas Carlyle. Relevant biographic, textual, ideational, and esthetic problems will be explored so as to acquaint the student with pertinent scholarly methods and materials, and to develop his competence in research and criticism. Given in alternate years, beginning 1951-52. Credit, 3.

Prerequisite, English 165.

Mr. GOLDBERG.

261. **MELVILLE.**—An exploration of the life, thought and art of the most complex and representative figure of the American Renaissance. Although emphasis will be placed upon the pre-Civil War novels, the later poetry will also be examined. Given in alternate years, beginning 1952-53. Credit, 3.

Prerequisite, English 167.

Mr. KAPLAN.

264. JOYCE, YEATS, AND ELIOT.—An intensive study of the experiments, in expressing personal experience, that established the Twentieth Century literary myths. Given in alternate years, beginning 1952-53. Credit, 3.
Prerequisite, English 176. Mr. VARLEY.

300. THESIS. Credit, 6-10.
THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

In these courses English majors are required to supplement the undergraduate assignments with a substantial special study.

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| 150. CHAUCER. | Credit, 3
Mr. HELMING. |
| 151. THE RENAISSANCE IN ENGLAND. | Credit, 3
Mr. TROY. |
| 153. LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND.—Given in alternate years, beginning 1952-53. | Credit, 3.
Mr. GOLDBERG. |
| 154. MILTON. | Credit, 3.
Mr. GOLDBERG and Mr. HELMING. |
| 155. SHAKESPEARE. | Credit, 3.
Mr. RAND. |
| 158. OTHER ELIZABETHAN DRAMATISTS. | Credit, 3.
Mr. O'DONNELL. |
| 159. THE AGE OF POPE. | Credit, 3.
Mr. TROY. |
| 160. THE AGE OF JOHNSON. | Credit, 3.
Mr. TROY. |
| 161. THE LAKE POETS.—Given in alternate years, beginning 1952-53. | Credit, 3.
Mr. RAND. |
| 162. BYRON, SHELLEY, AND KEATS.—Given in alternate years, beginning 1952-53. | Credit, 3.
Miss HERRIGAN. |
| 163. AMERICAN POETRY (1700-1900). | Credit, 3.
Mr. DuBois. |
| 165. PROSE OF THE ROMANTIC MOVEMENT. | Credit, 3.
Mr. GOLDBERG. |
| 166. VICTORIAN PROSE. | Credit, 3.
Mr. GOLDBERG. |
| 167. AMERICAN PROSE. | Credit, 3.
Mr. O'DONNELL. |

169. VICTORIAN POETRY.—Given in alternate years, beginning 1951-52.
Credit 3.
Mr. RAND.
173. ENGLISH PROSE FICTION.
Credit, 3.
Mr. HELMING.
174. GREEK CLASSICS IN TRANSLATION.
Credit, 3.
Mr. HELMING and Mr. TROY.
179. LITERARY CRITICISM FROM ARISTOTLE TO 1800.—Given in alternate years, beginning 1951-52.
Credit, 3.
Mr. GOLDBERG.
180. LITERARY CRITICISM SINCE 1800.—Given in alternate years, beginning 1951-52.
Credit, 3.
Mr. GOLDBERG.

COURSES FOR MINOR CREDIT ONLY

168. MODERN DRAMA.
Credit, 3.
Mr. RAND and Mr. WILLIAMS.
171. BIOGRAPHY.
Credit, 3.
Mr. HELMING.
172. THE BIBLE AS LITERATURE.
Credit, 3.
Mr. RAND.
176. MODERN POETRY.
Credit, 3.
Miss HERRIGAN and Mr. RAND.
177. THE MODERN NOVEL.
Credit, 3.
Mr. VARLEY.

Entomology

CHARLES P. ALEXANDER, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

(Most courses in the department are given on a 3-year cycle, subject to change on student demand.)

201, 202. ADVANCED INSECT MORPHOLOGY AND PHYLOGENY.—Laboratory, lecture, and reading assignments in morphology and phylogeny of all orders of insects, living and fossil. Credit, 3 each semester
Prerequisites, Entomology 26, 155, 156, 157 or equivalent. Mr. HANSON.

203. INSECT EMBRYOLOGY.—The embryological development of a generalized type of insect, after which specific insects are considered. Lectures, assigned readings, laboratory work. Credit, 2.
Prerequisite, ENTOMOLOGY 157. Mr. SHAW.

204. INSECT HISTOLOGY.—Types of tissues and organs of insects. Laboratory work, discussion and assigned readings. Credit, 2.
Prerequisites, Entomology 157; Zoology 50. Mr. SHAW.

207. **ADVANCED INSECT PHYSIOLOGY.**—Discussion and laboratory work dealing with the functions of the organ systems of insects. Emphasis is placed on methods of analysis and study of physiological processes in insects. Credit, 3. Prerequisite, Entomology 181 or equivalent. Mr. SWEETMAN.

210. **INSECT INTERRELATIONSHIPS.**—A systematic survey of the various ways in which insects live with, make use of, or are utilized by living organisms, including intra-specific relations; the aim is to present an integrated picture of relationships among insects, and between insects and the living world. Lectures, readings, papers. Credit, 2. Prerequisites, Entomology 26 and 179. Miss SMITH.

211. **INSECT BEHAVIOR.**—The honey bee is selected as a type for the study of behavior. Lectures; laboratory work to attempt to interpret the reasons for the actions of this insect. Other species may be included for completeness. Prerequisites, Entomology 26, 166 or equivalent. Credit, 3. Mr. SHAW.

212. **GEOGRAPHICAL DISTRIBUTION OF ANIMALS AND PLANTS.**—The entire field of distribution of life is considered, including a discussion of physical geography, climate, and other materials basic to the subject. Credit, 3. 2 credits 1st semester, 1 credit 2nd semester. Prerequisites, Botany 1; Zoology 1. Mr. ALEXANDER.

214. **ADVANCED ANIMAL ECOLOGY.**—Basic principles of terrestrial, limnological, and marine ecology. Special emphasis is placed on the influence of causal factors, both physical and biotic, that regulate the activities of all organisms. Prerequisite, Entomology 179, or equivalent. Credit, 3. Mr. SWEETMAN.

221. **ADVANCED CHEMICAL CONTROL OF INSECTS.**—The chemistry of insecticides and their physiological effects on insects, man and other animals. Credit, 3. Mr. SWEETMAN. Prerequisites, Entomology 180 and Pomology 156, or equivalent.

223. **ADVANCED BIOLOGICAL CONTROL.**—The basic fundamental principles, as well as practical application of biological control of insects. A section is devoted to control of pest weeds with insects. Credit, 3. Prerequisite, Entomology 180, or equivalent. Mr. SWEETMAN.

224. **LEGISLATIVE CONTROL OF INSECTS.**—The legal aspects of prevention, control, and eradication of pests. Emphasis is placed on the importance of basic knowledge of the biology and habits of insects and other pest organisms as related to legal and other methods of control and eradication. Credit, 3. Mr. SWEETMAN.

230. **ADVANCED APICULTURE.**—This course is designed to provide necessary background for whatever phase of beekeeping the student desires, equipment permitting. Among such topics available are management, biometry, bee poisoning, pollination. Credit, 2-5. Prerequisites, Entomology 166, 185, or equivalent. Mr. SHAW.

240. **COCCIDOLOGY.**—Lecture and laboratory work on scale insects; their relationships, structure, habits, technique of mounting, identification, damage, and control. Credit, 2. Prerequisite, Entomology 26, or equivalent. Mr. HANSON.

241. **CLASSIFICATION OF MINOR ORDERS OF INSECTS.**—Laboratory work in taxonomy of the many groups with relatively few species. Credit, 2. Prerequisites, Entomology 26, 155, 156, 157, or equivalent. Mr. HANSON.

242. **ADVANCED ARTHROPOD TAXONOMY.**—Classification of various groups of insects and insect allies, indicating the latest methods in taxonomy and the principles of classification. In addition to groups listed below, work may be offered in such groups as Ephemera, Plecoptera, Diptera (esp. Tipulidae and Mycetophilidae), Lepidoptera, and others upon special arrangement in advance.

Credit, 1-9.
THE STAFF.

A. Culicidae	Miss SMITH
B. Immature stages of insects	Miss SMITH
C. Ticks	Mr. SHAW
D. Siphonaptera	Mr. SHAW
E. Simuliidae	Mr. SHAW
F. Tabanidae	Mr. SHAW

245. **HISTORICAL ENTOMOLOGY.**—Lives and works of outstanding entomologists of the world; history of entomology; and classification of insects.

Credit, 3.
(2 credits 1st semester;
1 credit 2nd semester)

Prerequisites, Entomology 26, 153.

Mr. ALEXANDER.

248. **PRINCIPLES OF SYSTEMATIC ENTOMOLOGY.**—Particular stress is placed on a consideration of the International Code of Zoological Nomenclature, and the Opinions thereon; type categories; the species concept; major insect collections; leading entomological specialists.

Credit, 3.
(2 credits 1st semester;
1 credit 2nd semester)

Prerequisites, Entomology 26, 155, 156.

Mr. ALEXANDER.

250. **ADVANCED MEDICAL ENTOMOLOGY.**—This course is designed to provide training in whatever phase of medical entomology a student selects (materials and references permitting). Such work might include systematic studies of a family or order of insects involved in medical entomology, the biology of any particular group of insects, control measures.

Prerequisites, Entomology 174 or its equivalent.

Credit, 2-5.
Mr. SHAW.

270. **ADVANCED RESEARCH METHODS.**—The principles, methods of analysis, and presentation of results of research. A section is devoted to statistical treatment and analysis of research.

Credit, 3.
Mr. SWEETMAN.

Prerequisites, Research portion of Entomology 181, or equivalent.

280. **SEMINAR.**—Reports on the current literature of entomology; special reports by resident and visiting speakers.

One class hour.

Credit, 1 each semester.
(Max. for M.S. Candidates, 2)
(Max. for Ph.D. Candidates, 4)

300. **THESIS.**—Original work on one or more topics in insect morphology, systematic entomology, medical entomology, insect physiology, insecticides, biological control or apiculture. The thesis requires from one-half to two-thirds of the total working time of the student in his major field.

Credit, 10-30.
THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

175. ENTOMOLOGICAL TECHNIQUES.—Techniques in the mounting and preservation of insects for study and display by means of fluids, slides, plastics, pinning, and other methods. Credit, 2.

Prerequisite, Entomology 26.

Miss SMITH.

185. ADVANCED BEEKEEPING.—A course designed to present more complete knowledge of the more important problems of beekeeping, including management, processing honey and wax, bee diseases, and improvement of honeybees.

Credit, 3.

Prerequisite, Entomology 166.

Mr. SHAW.

187, 188. SPECIAL PROBLEMS IN ENTOMOLOGY.—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification.

Credit, 1, 2, or 3.

THE STAFF.

Prerequisites, Entomology 26, 53, 155, 157, and should be preceded or accompanied by other courses in the restricted field of the problem.

190. EVOLUTION.—A course in orientation. Lectures consider evolution of both organic and inorganic matter with attention to the evolution of human behavior and to the effect of evolutionary concepts on human philosophy. Extra supplementary reading required of graduate students.

Credit, 2-3.

Mr. HANSON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Botany 184. INSECT TRANSMISSION OF PLANT DISEASES. Credit, 2.

Mr. BANFIELD.

Zoology 174. LIMNOLOGY. Credit, 4.

Miss TRAVER and STAFF.

Zoology 185. CLASSES OF ARTHROPODS OTHER THAN INSECTS. Credit, 3.

Mr. HANSON.

COURSES FOR MINOR CREDIT ONLY

151. PESTS OF SPECIAL CROPS. Credit, 3.

Mr. SHAW.

155, 156. CLASSIFICATION OF INSECTS. Credit, 3.

Mr. ALEXANDER, Miss SMITH.

157. INSECT MORPHOLOGY. Credit, 4.

Mr. HANSON.

166. INTRODUCTORY BEEKEEPING. Credit, 3.

Mr. SHAW.

172. FOREST AND SHADE-TREE INSECTS. Credit, 3.

Mr. HANSON.

174. MEDICAL ENTOMOLOGY. Credit, 3.

Mr. SHAW.

179. ANIMAL ECOLOGY. Credit, 3.
Mr. SWEETMAN.
180. INSECT CONTROL. Credit, 3.
Mr. SWEETMAN.
181. PHYSIOLOGICAL ENTOMOLOGY. Credit, 3.
Mr. SWEETMAN.

Floriculture

CLARK L. THAYER, major adviser.

All students who major in this department are required to present a thesis as a part of the major requirements.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

Horticulture 203. EXPERIMENTAL METHODS.—A study of the basic concepts of field plot techniques and the statistical analysis of research data as applied to horticultural crops. This course is given by the Departments of Floriculture, Olericulture, and Pomology. Required of all graduate students majoring in Floriculture, Olericulture, and Pomology. Given in alternate years beginning 1952-53. Credit, 3.

Mr. FRENCH, Mr. WHITE and Mr. LACHMAN.

Horticulture 211, 212. SEMINAR.—Each student will present reviews of assigned papers on topics in Horticulture. Departments of Floriculture, Olericulture and Pomology cooperating. Required of all graduate students majoring in Floriculture, Olericulture and Pomology. Credit, 1 each semester.

THE DEPARTMENTS.

226. GARDEN MATERIALS.—Technical studies of a specific genus of plants or a group of plants used in gardening. Credit, 3.

Prerequisite, Floriculture 26.

Mr. DUNHAM.

275. ADVANCED COMMERCIAL FLORICULTURE.—Problems dealing with the methods of production of cutflowers and plants under glass. Opportunity is given for a study of factors concerned with methods of marketing such products. Credit, 3.

Mr. HUBBARD.

279. CONSERVATORY PLANTS.—Investigations dealing with plant materials which are used primarily in conservatories or in gardens in warm climates. Credit, 3.

Mr. THAYER.

290. HISTORY OF FLORICULTURE AND FLORICULTURAL LITERATURE.—Consideration of men who have influenced the development of floriculture. Events that have given impetus to the industry. Survey of floricultural literature. Required of all graduate students in the department. Credit, 3.

Mr. THAYER.

297, 298. SEMINAR.—A review of scientific literature in the field of floriculture or in related fields. Credit, 1 each semester.

Mr. WHITE and THE STAFF.

300. THESIS.—For students having a major in Floriculture. Based on an original investigation of a problem selected by agreement between the student and the staff.

Credit, not to exceed 10.

Mr. THAYER and THE STAFF.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 263. CHEMISTRY OF THE SOIL.	Credit, 3 each semester Mr. STECKEL.
Botany 161, 162. THE COMPARATIVE ANATOMY OF GREEN PLANTS.	Credit, 3 each semester. Mr. TORREY.
Botany 158. MICROTECHNIQUE.	Credit, 2. Mr. TORREY.
Botany 159, 160. THE ANGIOSPERMS.	Credit, 2-3 each semester. Mr. TORREY.
Olericulture 201. LITERATURE.	Credit, 3. Mr. LACHMAN.
Plant Breeding 152. ADVANCED PLANT BREEDING.	Credit, 3. Mr. FRENCH.
Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUE.	Credit, 2. Mr. FRENCH.
Plant Breeding 182. SPECIAL PROBLEMS.	Credit, 2. Mr. FRENCH.

COURSES FOR MINOR CREDIT ONLY

151. GREENHOUSE MANAGEMENT.	Credit, 3. Mr. THAYER and Mr. DUNHAM.
152. FLORAL ARRANGEMENT.	Credit, 3 Mr. THAYER and Mr. ROSS.
175, 176. COMMERCIAL FLORICULTURE.	Credit, 3 each semester. Mr. HUBBARD.
179. CONSERVATORY PLANTS.	Credit, 2. Mr. THAYER and Mr. DUNHAM
181. HERBACEOUS GARDENS AND BORDERS.	Credit, 3 Mr. HUBBARD
182. SEMINAR (Problem course).	Credit, 3 Mr. THAYER.

Food Sciences

This is a cooperative major designed for Ph.D. candidates who wish to prepare for research in various phases of the food sciences. It is designed to give a broader and somewhat less intensive scientific base for research or its application in industry than is possible when a student takes most of his major work in one department only. This plan provides for a candidate to place the major emphasis in one of the five departments cooperating which may or may not offer a Ph.D. degree in the department.

The departments cooperating are Bacteriology, Chemistry, Dairy Industry, Food Technology, and the School of Home Economics (Foods and Nutrition). Courses, if properly selected, will satisfy both major and minor requirements. The proportionate contribution of each department will depend upon the student's special interests within the field but a minimum of six credits must be earned in each of the departments contributing to this major.

Candidates for the Ph.D. degree in the Food Sciences are assigned to an advisory committee composed of the heads of the five departments concerned, with the head of the department in which the thesis research is planned serving as chairman. This advisory committee will direct the student's progress, conduct the preliminary examination, and approve the thesis subject and plan of execution. The thesis committee will be appointed by the Scholarship Committee of the Graduate School Council with the staff member who is directing the thesis serving as chairman.

The 30 major course credits required for the Ph.D. must be distributed among at least 3 of the 5 departments concerned. The minimum requirement of six credits in other departments may be satisfied by either major or minor credits. Courses offered by the 5 departments which are acceptable for major credit toward the degree in Food Sciences have been designated by the advisory committee as follows:

(For major credit except when noted)

Bacteriology

- 202. BACTERIAL PHYSIOLOGY.
- 203. BACTERIAL CYTOLOGY.
- 204. ADVANCED STUDIES OF SPECIAL BACTERIAL GROUPS
- 205. ADVANCED IMMUNOLOGY.
- 206. INDUSTRIAL BACTERIOLOGY.
- 207. VIROLOGY.
- 208. SEMINAR.
- 182. FOOD BACTERIOLOGY.
- 185. IMMUNOLOGY.
- 190. SANITARY BACTERIOLOGY.

Chemistry

- 237. BIOCOLLOIDS.
- 239. CHEMISTRY OF NATURAL PRODUCTS.
- 165, 166. PHYSICAL CHEMISTRY. (For minor credit only)
- 179. BIOCHEMISTRY. (For minor credit only)
- 183. ADVANCED QUANTITATIVE ANALYSIS.
- 193, 194. GENERAL BIOCHEMISTRY.

Dairy Industry

- 175. DAIRY CHEMISTRY.
- 201. PROBLEMS IN DAIRY TECHNOLOGY.
- 202. ADVANCED DAIRY CHEMISTRY.
- 209, 210. SEMINAR.

Food Technology

- 201, 202. SPECIAL INVESTIGATIONS.
- 210, 211. THERMAL PROCESSING OF FOODS.
- 216. FOOD PACKAGING.
- 221. EDIBLE FATS AND OILS.
- 271, 272. SEMINAR.
- 285, 286. FISHERIES TECHNOLOGY.
- 161, 162. INDUSTRIAL PRACTICES.
- 191, 192. FOOD ANALYSIS.

Foods & Nutrition

- 203. ADVANCE NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.
- 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.
- 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.
- 207. PROBLEMS IN NUTRITION.
- 211, 212. NUTRITION SEMINAR.
- 189. DIET THERAPY.

Food Technology

CARL R. FELLERS, major adviser.

Graduate students who wish to major in Food Technology may not be admitted to candidacy for an advanced degree until such time as the undergraduate requirements in basic sciences and Food Technology have been substantially met.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201, 202. SPECIAL INVESTIGATIONS.—A series of individual problems and assignments covering plant layouts, process development, quality control and economics of production. Laboratory, pilot plant and library exercises.

Credit, 1-3 each semester.

THE STAFF.

Two bound copies (flexible binding permissible) are required by the Department.

210, 211. THERMAL PROCESSING OF FOODS.—Biological and Physical Aspects. A study of the factors affecting heat transfer in canned goods. Heating characteristics of canned foods packed in tin, glass, and other containers. Determination of thermal death points of spoilage micro-organisms. Derivation of processing times and temperatures. Causes of spoilage and container failure. Principles of retort operation and control; instrumentation.

First semester—2 lectures or conferences.

Credit, 2.

Second semester—1 lecture, one 4-hour laboratory.

Credit, 3.

Prerequisites, Food Tech. 162 and Bact. 182.

Mr. ESSELEN.

212. FREEZING AND REFRIGERATION.—Lay-out of cold storage plants. Practical refrigeration systems. Equipment and methods used in quick-freezing fruits, vegetables, meats, and marine products. Packaging and quality control. Home freezers and commercial frozen-food lockers. Laboratory and class work.

Prerequisites, Food Tech. 152, Ag. Engin. 180 or 182.

Credit, 2-4.

Mr. FELLERS.

216. FOOD PACKAGING.—A study of the characteristics of all packaging materials including flexible films and how they meet the package requirements of various food products. Methods of testing for structural quality and performance, moisture and gas transmission, and other properties. Consideration of adhesives, lacquers and closures included. Occasional lectures by qualified representatives of industry. Plant visits in non-scheduled hours.

One 4-hour laboratory period; one or more class or discussion hours. Credit, 3.

Prerequisite, Food Tech. 162.

Mr. LEVINE.

221. EDIBLE FATS AND OILS.—The production and uses of edible fats and oils and their chemical nature in relationship to stability. The problem of oxidation and rancidity is considered with emphasis on cause of deterioration and methods of stabilization.

Credit, 2.

One class hour, one 2-hour laboratory period.

Mr. ANDERSON.

232. UNIT PROCESSES.—Unit processes pertaining to the food industries are covered. The work includes instrumentation, temperature measurement, blanching, filtration, comminution, deaeration and extraction, processing, cooling, heat transfer, fluid flow, distillation, dehydration, and evaporation. Credit, 2.

Mr. FAGERSON.

Prerequisites, Food Tech. 162 and Ag. Engin. 180.

271, 272. SEMINAR.—Assigned readings and reports from scientific and technical literature of food technology. Special lectures and round table discussions. Credit, 1-2 each semester.

THE STAFF.

285, 286. FISHERIES TECHNOLOGY.—Marine products of commerce. Processed seafoods. Canning, curing, freezing and refrigeration. Spoilage problems. By-products. Chemical and microbiological aspects. Scientific literature. Industrial problems. Credit, 2-3 each semester.

One class hour plus laboratory work to be arranged.

Mr. FELLERS.

295. BIOLOGICAL ASSAY OF FOODS.—Provides laboratory training and practice in making animal and microbiological assays of food constituents important in human and animal nutrition. Credit, 2-5.

Prerequisites, Chem. 179 and Food Tech. 192.

Mr. FELLERS.

300. THESIS.—Research on some suitable problem in Food Technology. Facilities for nutrition research are provided by well-equipped chemical, physical, and small-animal laboratories and poultry plant. Credit, 10-30.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

161, 162. INDUSTRIAL PRACTICES.—Advanced laboratory and pilot plant work in the production of canned, frozen and dehydrated fruits, vegetables, meat, and fish products. The theory and practice in manufacturing jams, jellies and condiments as well as fermented, salted and smoked foods; cereal products and soups. Credit, 3 each semester.

One class hour, one 4-hour laboratory period.

Mr. LEVINE.

182. CONFECTIONS AND CEREAL PRODUCTS.—Candy making, maple products, sugar and fountain syrups, corn products such as starch, syrups, dextrose and their uses. Candied fruits and preserves. Flavoring essences, spices, carbonated beverages. This course also considers the principles of baking, doughs, and various prepared cereals and dry mixes. Credit, 3.

One class hour, one 4-hour laboratory period.

Mr. LEVINE.

191, 192. ANALYSIS OF FOOD PRODUCTS.—Factory and laboratory methods. Grades and quality factors; physical, chemical, microbiological and microscopical methods, and interpretation of results. Government and trade standards; Federal and State food regulations; mold and insect counts; plant control procedures will be stressed. Food preservatives and flavorings. Credit, 3 each semester.

Mr. FELLERS and Mr. NEBESKY.

(The second semester is a continuation of 191 with emphasis on the public health aspects of food analysis and quality control; plant sanitation.)

One 4-hour laboratory period, one lecture.

Prerequisites, Chem. 30, Food Tech. 152 or 175.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Dairy Industry 152. MARKET MILK.	Credit, 4. Mr. LINDQUIST.
Dairy Industry 177. BUTTER AND CHEESE.	Credit, 4. Mr. LINDQUIST, Mr. NELSON and Mr. FINNEGAN.
Dairy Industry 178. ICE CREAM MAKING.	Credit, 4 Mr. NELSON.
Animal Husbandry 154. MEAT PROCESSING.	Credit, 2. Mr. TIMBERLAKE.
Botany 166. INDUSTRIAL MYCOLOGY.	Credit, 3. Mr. BANFIELD.
Home Economics 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.	Credit, 3. Mrs. WERTZ.
Olericulture 173. VEGETABLE MARKETING PRACTICES.	Credit, 3. Mr. SNYDER
Olericulture 174. MERCHANDIZING OF PERISHABLES.	Credit, 3. Mr. SNYDER.

COURSES FOR MINOR CREDIT ONLY

151. FRUIT AND VEGETABLE PRODUCTS.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing, and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded. Credit, 3.

One class hour, one 4-hour laboratory period.

Mr. FELLERS.

152. FOOD PRODUCTS AND ADJUNCTS.—This is a continuation of 151. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments and the preservation of meats, poultry and vegetables. The properties and uses of sugars, syrups, salt, enzymes, pectin, chemical preservatives and anti-oxidants, are considered. Practice is given in the use and handling of instruments and equipment. Credit, 3.

Two class hours, one 2-hour laboratory period.

Mr. FELLERS.

175, 176. FOOD PRESERVATION.—This is a general course in food preservation and is intended only for those who desire a survey of the field in a condensed form. Not open to Food Technology majors. Credit 3, either semester.

One class hour, two 2-hour laboratory periods.

Mr. NEBESKY.

195, 196. INTRODUCTORY RESEARCH METHODS.—The application of the fundamental sciences to food technology research. Library and laboratory research on assigned individual problems. Credit, 2 each semester.

By arrangement.

Mr. FELLERS, Mr. LEVINE.

Forestry

COURSES FOR MINOR CREDIT ONLY.

151. **FOREST MANAGEMENT OF WATERSHEDS.**—A study of forest site and water factor relationships; the measurability of the forest resources and their management toward realizing the multiple values of watersheds. The protection of forested watersheds. Credit, 3.

Mr. RHODES, Mr. STICKEL and Mr. HOLDSWORTH.

153. **SILVICS.**—Forest ecology as the basis for silvacultural practice. Credit, 3.
Mr. RHODES.

154. **FOREST SOILS.**—A study of the soils of forests as they influence forest growth and management and as they are influenced by forest trees and forest management. Credit, 3.
Mr. RHODES.

155. **ELEMENTS OF FOREST MENSURATION.**—Methods of inventorying the volumes of the timber capital or growing stock and other resources of the forest, including growth rates and increase in wood volume. Credit, 3.
Mr. HOLDSWORTH and Mr. COLE.

156. **PRINCIPLES OF APPLIED SILVICULTURE.**—Forest establishment and cultural development through silvacultural practice. Credit, 3.
Mr. RHODES, Mr. HOLDSWORTH and Mr. MACCONNELL.

157. **ECONOMICS OF FORESTRY.**—The resource values of the forest with the history of their economic development. Credit, 3.
Mr. HOLDSWORTH.

159. **FOREST PROTECTION.**—The principle of protecting forests from all harmful agencies. Credit, 3.
Mr. STICKEL.

176. **WOOD TECHNOLOGY.**—A comprehensive survey of the structure, composition and properties of wood in relation to wood utilization. Credit, 3.
Mr. RICH.

178. **HARVESTING OF FOREST PRODUCTS.**—Methods of harvesting forest products in the several forest regions of the United States. Credit, 3.
Mr. RICH.

185. **SEASONING OF WOOD.**—Methods of air seasoning and kiln drying lumber. Credit, 3.
Mr. RICH.

Geology and Mineralogy

LEONARD R. WILSON, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY.

(For either major or minor credit)

201. **OPTICAL MINERALOGY.**—An introduction to the theory, procedure and technique involved in the study of minerals by means of the petrographic microscope. The laboratory work will include the preparation of thin sections of minerals and rocks, together with a study of their optical properties by means of polarized light. Credit, 3.

Given in alternate years, beginning 1952-53.
Prerequisite, Geology 151.

Mr. NELSON.

212. **SEDIMENTATION.**—A course dealing with the sources, deposition, modifying conditions, structures and environmental relationships of sediments and their consolidated equivalents. Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. LIGHT.

221. **ANIMAL MICROPALAEONTOLOGY.**—Principles of animal micropaleontology with emphasis on the use of animal microfossils in stratigraphic investigations.

Credit, 3.

Mr. WILSON and Mr. JOHANSSON.

222. **PLANT MICROPALAEONTOLOGY.**—Principles of plant micropaleontology with emphasis on the use of plant microfossils in stratigraphic investigations.

Credit, 3.

Mr. WILSON.

241. **SEMINAR.**—Review of current literature or discussion of selected topics.

Credit, 1 each semester. Maximum credit, 2.

THE STAFF.

300. **THESIS.**—Research on an approved problem.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

173. **STRUCTURAL GEOLOGY.**—A study of the origin of rock structures, their occurrence and recognition. Undergraduates must have the permission of the instructor before enrolling.

Credit, 3.

Mr. LIGHT.

174. **PRINCIPLES OF STRATIGRAPHY.**—A study of the principles of stratigraphic correlation as related to the major rock units of the United States. Undergraduates must have the permission of the instructor before enrolling.

Credit, 3.

Mr. WILSON.

COURSES FOR MINOR CREDIT ONLY

151. **MINERALOGY.**—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. NELSON.

152.—**PETROLOGY.**—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. NELSON.

161. **GEOMORPHOLOGY.**—A review of recent studies concerning rock structures, weathering, underground water, streams, alpine and continental glaciers, shorelines, and wind work. Given in alternate years, beginning 1952-53.

Credit, 3.

Two class hours; one 2-hour laboratory period.

Mr. WILSON.

162. **GEOMORPHOLOGY.**—A review of recent studies concerning the physical geological role of organisms, coastal plains, plains and plateaus, volcanoes, dome, block, folded and complex mountains. Given in alternate years, beginning 1952-53.

Credit, 3.

Two class hours; one 2-hour laboratory period.

Mr. WILSON.

163. **INVERTEBRATE PALEONTOLOGY.**—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.
One class hour; two 2-hour laboratory periods. Credit, 3.

Mr. JOHANSSON.

164. **PLANT PALEONTOLOGY.**—A study of the history, development and identification of plant fossils. Field trips by arrangement. Credit, 3.
One class hour; two 2-hour laboratory periods. Mr. WILSON.

Government

COURSES FOR MINOR CREDIT ONLY

152. **EUROPEAN GOVERNMENT.**—A comparative study of politics and government in European countries with special attention to problems of modern democracy and dictatorship. Credit, 3.
Prerequisite, Government 25. Mr. WALKER.

162. **ADMINISTRATIVE LAW.** Credit, 3.
Mr. NEEDHAM.

163. **POLITICAL PARTIES AND ELECTIONS.** Credit, 3.
Mr. MITCHELL.

164. **MUNICIPAL GOVERNMENT.** Credit, 3.
Mr. GOODWIN.

165. **CONSTITUTIONAL LAW.** Credit, 3.
Mr. NEEDHAM.

166. **AMERICAN POLITICAL THOUGHT.** Credit, 3.
Mr. MITCHELL.

167. **INTERNATIONAL GOVERNMENT.**—A study of international organization in the twentieth century, with emphasis upon the United Nations and regional organizations. Credit, 3.
Mr. WALKER.

168. **INTERNATIONAL LAW.**—A study of the scope and significance of international law in contemporary international relations. Credit, 3.
Mr. WALKER.

171. **ANCIENT AND MEDIEVAL POLITICAL THOUGHT.** Credit, 3.
Mr. MITCHELL.

172. **MODERN POLITICAL THOUGHT.** Credit, 3.
Mr. MITCHELL.

193, 194.—**SEMINAR.**—A study of special problems in the field of government. Credit, 3 each semester.
THE STAFF.

History

THEODORE C. CALDWELL, major adviser.

In addition to the general requirements for the Master of Arts degree, candidates in History must fulfill the following departmental requirements:

All candidates are required to take the *Graduate Record Examination*. If possible, this should be taken before admission to the Graduate School; otherwise, it must be taken as soon as possible after admission.

A reading knowledge of one foreign language is required.

The requirement concerning a thesis may be fulfilled by one of the following options: (a) completion of a thesis, for ten credits, (b) completion of two seminar courses, with grades of at least 80, (c) completion of a five credit thesis and one seminar.

A comprehensive written examination, in fields specified by the Department, is required of all candidates.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—1815-1896.
—An analysis of developments in the principal sections of the U. S. Credit, 3.
Prerequisites, 159 and 160. Mr. DAVIS.

210. THE PROGRESSIVE MOVEMENT AND THE NEW DEAL IN THE UNITED STATES, 1896-1940.—Conditions and ideas in the revolt against conservatism.
Credit, 3.
Prerequisites, History 159 and 160. Mr. CARY.

251. SEMINAR IN AMERICAN DIPLOMATIC HISTORY.—Training in historical research.
Credit, 3.
Admission by consent of instructor. Mr. CARY.

256. SEMINAR IN THE WESTWARD MOVEMENT OF THE UNITED STATES.—Training in historical research.
Credit, 3.
Admission by consent of instructor. Mr. DAVIS.

300. THESIS. Credits, 5 or 10.
THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

The following courses are open to both graduate and undergraduate students who have fulfilled the prerequisites, History 5 or 6 or their equivalent. Graduate students will be expected to do such additional work as shall be prescribed by the instructor.

151. ANCIENT HISTORY. Credit, 3.
Mr. DAVIS.

153. INTERNATIONAL RELATIONS. Credit, 3.
Mr. ASHTON.

154. THE FAR EAST IN MODERN TIMES.—Given in alternate years, beginning 1952-53.
Credit, 3.
Mr. ASHTON.

156. THE HISTORY OF MODERN RUSSIA.—Given in alternate years, beginning 1951-52.
Credit, 3.
Mr. ASHTON.

157 and 158. HISPANIC-AMERICAN HISTORY. Credit, 3 each semester.
Mr. POTASH.

165. NINETEENTH AND TWENTIETH CENTURY ENGLAND. Given in alternate years, beginning 1951-52.
Credit, 3.
Prerequisite, History 32 or permission of instructor. Mr. CALDWELL.

167. TUDOR AND STUART ENGLAND. Given in alternate years, beginning 1952-53. Credit, 3.
Prerequisite, History 31 or permission of instructor. Mr. CALDWELL.
169. EUROPE, 1870-1918. Credit, 3.
Mr. CALDWELL.
170. EUROPE, SINCE 1918. Credit, 3.
Mr. CALDWELL.
172. HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893. Credit, 3.
Prerequisite, History 159 or permission of instructor. Mr. DAVIS
175. MEDIEVAL EUROPE. Credit, 3.
Mr. ZEENDER.
176. HISTORY OF THE RENAISSANCE. Credit, 3.
Mr. ZEENDER.
- 177, 178. THE HISTORY OF SCIENCE IN WESTERN CIVILIZATION. Credit, 2 each semester.
Miss BOAS.
181. DIPLOMATIC HISTORY OF THE UNITED STATES, 1776-1900. Credit, 3.
Prerequisites, History 159 and 160 or permission of instructor. Mr. CARY.
182. DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900. Credit, 3.
Prerequisites, History 159 and 160 or permission of instructor. Mr. CARY.
191. HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians. Credit, 1.
Mr. CARY.
192. SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports. Credit, 1.
Mr. CARY.

COURSES FOR MINOR CREDIT ONLY

- 159, 160. HISTORY OF THE UNITED STATES. Credit, 3.
Mr. CARY.

Home Economics

HELEN S. MITCHELL, major adviser

Graduate students in Home Economics are accepted in the two fields of Nutrition and Home Economics Education. Those applying for graduate work in Nutrition should have an undergraduate major in Foods and Nutrition or its equivalent with strong offerings in Organic, Biochemistry, Physiology, and Bacteriology. Students applying for graduate work in Home Economics Education should have an undergraduate major in Home Economics with some courses in Education and Practice Teaching. The major work in this field is offered jointly by the School of Home Economics and the Department of Education with certain courses in Education accepted for major credit as listed herewith.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. PROBLEMS IN FOODS.—An advanced study in the chemistry of foods. Designed mainly to equip a student for food testing or analyzing food products. Special emphasis on individual research problems. Credit, 3.

Hours by arrangement.

Miss DAVIS.

Prerequisites, Home Ec. 193, Quantitative Chemistry, or equivalent, and permission of instructor.

203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.—A study is made of energy metabolism and the metabolism of carbohydrates, fats, proteins, and related substances, their role in human nutrition, and physiological effects of dietary inadequacies. A critical evaluation of food value tables and other reference material is made. Students are expected to give special reports from current literature supplementing class discussion. Credit, 3.

Prerequisites, Physiological Chemistry and/or Physiology. Miss MITCHELL.

204. ADVANCED NUTRITION—MINERALS AND VITAMINS.—A detailed study is made of mineral metabolism, function in the body and the result of deficiencies. The vitamins will be discussed from the standpoint of food distribution, function, chemical nature and stability, assay methods, and result of deficiencies. Credit, 3.

Miss MITCHELL.

Prerequisite, Home Ec. 203, or equivalent.

205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.—Laboratory course designed to acquaint qualified students with the different types of laboratory techniques that are currently used in nutrition research. These methods include fluorometric, colorimetric, spectrophotometric, and microbiological determinations of various nutrients in foods and biological fluids. Credit, 3.

1 class hour, one 4-hour lab.

Mrs. WERTZ.

Prerequisites, Quantitative Chemistry, Home Ec. 203, 204, or equivalent.

207. PROBLEMS IN NUTRITION.—Qualified students may be permitted to work on a problem of special interest to them in the fields of vitamin and mineral metabolism, basal metabolism, dietary survey techniques, etc. Credit, 4.

Prerequisite, Home Ec. 205.

Mrs. WERTZ.

208. HOME ECONOMICS SEMINAR. Readings, reports and discussions on the current literature of the following areas—family relations, family economics, and home management. Credit, 3.

Mrs. PIATT and Miss MERRIAM.

211, 212. NUTRITION SEMINAR.—Readings, discussions and preparation of bibliographies on nutrition problems of current interest. Credit, 1 each semester.

Miss MITCHELL.

251. PROBLEM.—An intensive study of a special problem in the field of Home Economics. This type of problem is recommended instead of a thesis for certain students. Credit, 4.

THE STAFF.

300. THESIS.—Individual research in the field of nutrition and the preparation of an acceptable thesis reporting results and analysis of such studies.

Credit, 10.

THE STAFF.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Chemistry 234.	ADVANCED BIOCHEMICAL LECTURES.	Credit, 3. Mr. TURNER.
Chemistry 237.	BIOCOLLOIDS.	Credit 3. Mr. TURNER.
Chemistry 239.	CHEMISTRY OF NATURAL PRODUCTS.	Credit, 2. Mr. TURNER.
Education 153.	EDUCATIONAL TESTS AND MEASUREMENTS.	Credit, 2-3. Mr. ROURKE.
Education 166.	PREPARATION AND USE OF AUDIO-VISUAL AIDS.	Credit, 2-3. Mr. WYMAN.
Education 291.	EDUCATIONAL RESEARCH AND STATISTICS.	Credit, 2. Mr. PURVIS.
Food Technology 191, 192.	EXAMINATION OF FOOD PRODUCTS.	Credit, 3 each semester. Mr. FELLERS, and Mr. NEBESKY.

COURSES FOR MINOR CREDIT ONLY

152. NUTRITION AND DIETETICS.—A study is made of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides the further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc., is given consideration.

Three class hours, one 2-hour laboratory period. Credit, 3.
Prerequisites, Home Ec. 30, Chemistry 31 and 32, or Physiology. Mrs. Cook.

170. CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, the aspects of behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in the Nursery School.

Three class hours; laboratory by arrangement. Credit, 3.
Mrs. THIES.

175. ECONOMICS OF THE HOUSEHOLD.—A study is made of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation.

Credit, 3.
Prerequisite, Economics 25, or equivalent. Miss MERRIAM.

180. FAMILY LIFE.—A study is made of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.

Credit, 3.
Mrs. PIATT.

191, 192. INSTITUTIONAL FOODS AND MANAGEMENT.—A study is made of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special functions of the dietitian. Laboratory work is planned at the College Dining Hall and dormitories. It is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Economics 81.

One class hour; one 5-hour laboratory period. Credit, 3 each semester.
Prerequisite, Home Ec. 51 and 52. Mrs. ESCHHOLZ.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181. **METHODS OF TEACHING HOME ECONOMICS.**—A study is made of general education philosophy; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers. During the last month a two-hour laboratory period replaces one lecture.

Credit, 3.

Mrs. PIATT.

185. **THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.**—This course is planned to give students a background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature and sciences; fundamentals of play and use of play material and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.

Credit, 3.

Prerequisite, Home Ec. 84.

Mrs. THIES.

187. **PRINCIPLES AND PRACTICES OF TAILORING.**—Emphasis is placed on handling of wool in the making of suits and coats.

Credit, 3.

One class hour; one 4-hour laboratory period.

Mrs. WILHELM.

Prerequisite, Home Ec. 61 or its equivalent.

188. **APPLIED DRESS DESIGN.**—Costume design through draping and pattern making. An intensive study is made of texture, line, color, and fit as applied to dress design and the figure.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mrs. WILHELM.

Prerequisite, Home Ec. 61 or its equivalent.

189. **DIET THERAPY.**—The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease.

Credit, 3.

Mrs. COOK.

Prerequisites, Home Ec. 52 or 103 and 104; Physiological Chemistry; Physiology.

193. **EXPERIMENTAL FOODS.**—The testing and comparing of different food materials and methods of preparation, including advanced work in the science and techniques of cookery. Special individual problems will be studied.

Two class hours; One 3-hour laboratory period

Credit, 3.

Miss DAVIS.

Prerequisites, Home Ec. 30 and 51; Chemistry 31 and 32, or equivalent, and permission of the instructor.

198. **PROBLEMS IN HOME ECONOMICS.**—An intensive study of some phase of home economics.

Credit, 2.

By permission of the Dean of the School.

THE STAFF.

Landscape Architecture

RAYMOND H. OTTO, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY.

(For either major or minor credit)

290. THEORY.—Special studies in the history and theory of art and landscape architecture. Credit, 3.

Mr. ROBERTSON.

291. DESIGN.—Individual problems in any or all branches of public and private work. Credit, 3.

Mr. OTTO.

292. CONSTRUCTION.—Individual problems by arrangement, including estimating, cost accounting, and methods of construction. Credit, 3.

Mr. HAMILTON.

293. PRESENTATION.—Studies in drafting, pen and crayon, rendering, water coloring, etc. Credit, 3.

Mr. MACIVER.

294. PRACTICE.—Professional field work under supervision, conducted upon going projects as opportunity offers. Credit, 3

Mr. BLUNDELL.

297. ARCHITECTURE.—Selected problems as related to landscape architecture. Credit, 3.

Mr. ROBERTSON.

300. THESIS. Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

175. ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts. Credit, 3.

Mr. OTTO.

176. CIVIC ART.—A survey of the principles of site and city planning and their application. Credit, 3.

Mr. OTTO.

Prerequisites, Landscape Architecture 151, 152.

177. HISTORY OF ART.—An appreciative survey of art and history from early times through the medieval period. Credit, 3.

Mr. ROBERTSON

178. HISTORY OF ART.—Continuation of 177 beginning with the Renaissance period to modern times. Credit, 3.

Mr. ROBERTSON.

179. CONSTRUCTION AND MAINTENANCE.—A study of methods and materials of construction, and maintenance procedures. Credit, 3.

Mr. PROCOPIO.

180. LITERATURE OF LANDSCAPE ARCHITECTURE.—A review of the significant literature of all phases of the field, and compiling of bibliographies.

Credit, 2.

Mr. HAMILTON.

181. ADVANCED DESIGN.—Class "B" Exchange Problems plus specialized study through local projects.

Credits, 3.

Prerequisites, Landscape Architecture 153, 154.

Mrs. HAMILTON.

182. ADVANCED DESIGN. Continuation of 181.

Credit, 3.

Mr. HAMILTON.

183. ARCHITECTURE.—The history of architectural development including styles and construction principles.

Credit, 3.

Mr. ROBERTSON.

184. SKETCHING.—Presentation of varied subjects in water color and other mediums.

Credit, 2.

Mr. ROBERTSON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 153. AGROSTOLOGY.

Credit, 3.

Mr. DICKINSON.

Agronomy 156. AGROSTOLOGY.

Credit, 3.

Mr. DICKINSON.

Botany 181. PLANT ECOLOGY.

Credit, 3.

Mr. LIVINGSTON.

Floriculture 181. HERBACEOUS GARDENS AND BORDERS.

Credit, 3.

Mr. HUBBARD.

COURSES FOR MINOR CREDIT ONLY

151. ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.—Contour interpolation, grading and drainage plans, drive design, sections and profiles, computation of earthwork.

Credit, 3.

Mr. PROCOPIO.

152. CONSTRUCTION DETAILS.—Problems in structural garden features as walks, steps, walls, gates, pools, and architectural elements.

Credit, 3.

Mr. PROCOPIO.

153. GARDEN DESIGN.—Fundamental principles of composition as applied to the design of gardens and small properties.

Credit, 3.

Mr. OTTO.

154. GENERAL DESIGN.—A series of problems in the design of private and public areas.

Credit, 3.

Mr. OTTO.

FOR THE DEGREE OF BACHELOR OF LANDSCAPE ARCHITECTURE

To receive this professional bachelor's degree each candidate will be required:

1. To have received the degree of Bachelor of Science or Bachelor of Arts from a recognized institution, and stand in the upper half of his class.
2. To have completed as a prerequisite 24 semester credits in technical courses in landscape architecture, substantially equivalent to the technical courses now required in the undergraduate major in landscape architecture at this college.
3. In addition, to have completed in residence at this institution, 30 credits in landscape architecture and closely related subjects prescribed by the department. (See Fifth Year Program below.)
4. To have received the unanimous approval of the faculty of the department and the vote of approval of the faculty of the Graduate School.

FIFTH YEAR PROGRAM

The regular program of studies for the Fifth Year, subject to minor changes dependent upon courses taken previously, is as follows:

First Semester

201. GENERAL DESIGN.—Class A Exchange problems and advanced local projects.
Credit, 3.

Mr. OTTO.

203. ECOLOGY AND PHYSIOGRAPHY.—Plant Associations and ground forms and conditions as related to each other.
Credit, 3.

Mr. BLUNDELL.

205. ARCHITECTURE.—Studies in principles and problems of architectural design.
Credit, 3.

Mr. ROBERTSON.

207. CONTRACTS, SPECIFICATIONS, ESTIMATING COSTS.—Preparation of supporting data for proposed plans.
Credit, 3.

Mr. HAMILTON.

209. LANDSCAPE SKETCHING.—Graphic expression of suitable subjects in various media.
Credit, 3.

Mr. MACIVER.

Second Semester

202. GENERAL DESIGN.—Continuation of 201.
Credit, 3.

Mr. OTTO.

204. LANDSCAPE FORESTRY.—Woodland management and silvicultural practices.
Credit, 3.

Mr. STICKEL.

206. ARCHITECTURE.—Studies in principles and problems of architectural design.
Credit, 3.

Mr. ROBERTSON.

210. ARCHITECTURAL SKETCHING.—Graphic expression of suitable subjects in various media.
Credit, 3.

Mr. MACIVER.

212. PROFESSIONAL PRACTICE.—Methods and procedures of the professional office.
Credit, 1.

Mr. OTTO.

Elective: Suitable subject assigned.

Mathematics

ALLEN E. ANDERSEN, major adviser.

Special Departmental Entrance Requirements:

Candidates for admission who plan to major in this department must have completed at least eighteen semester credit hours in undergraduate mathematics beyond the content of Mathematics 29 and 30 (Differential and Integral Calculus), and also an undergraduate course equivalent to Physics 25 and 26 (Introductory).

Special Degree Requirements:

6 semester credit hours in each of the fields of geometry, algebra and applied mathematics and 12 semester credit hours in the field of analysis. A minimum of 12 semester credit hours chosen from courses in this department which are numbered from 201 to 299.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201, 202. INTRODUCTION TO MODERN ALGEBRA.—Axiomatic foundation of algebra; groups, rings, fields and vector spaces; linear transformation and matrices.

Credit, 3 each semester.

3 class hours.

Mr. ROSE.

Prerequisite, consent of instructor.

221, 222. THEORY OF FUNCTIONS OF A REAL VARIABLE.—The real number system, limits, continuity and differentiability of functions of one and two real variables, theories of integration, sequences of functions.

3 class hours.

Credit, 3 each semester.

Mr. WAGNER.

Prerequisite, Mathematics 191.

226. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE.—The complex number system, elementary functions and their mappings, line and contour integrals, expansion and representations of analytic function, introduction to analytic continuation and Riemann surfaces.

Credit, 3.

3 class hours.

Miss CULLEN.

Prerequisite, Mathematics 221.

241. TOPOLOGY I.—Point Set Topology: Calculus of sets; Topological, Hausdorff and metric spaces; continuous mappings; homeomorphisms; connectivity and compactness.

Credit, 3.

Prerequisite, Mathematics 194.

Miss CULLEN.

242. TOPOLOGY II.—Combinatorial Topology: Continuous complexes; Jordan's Theorem, Homology and Homotopy.

Credit, 3.

Prerequisite, Mathematics 241.

Miss CULLEN.

299. TOPICS COURSE.—This course is designed to give the student training in independent study. Readings and reports will be assigned. Weekly conferences will be held between student and instructor. Topics may be chosen from the fields of algebra, geometry, theory of functions, and applied mathematics.

Prerequisite, Consent of instructor.

Credit, 1, 2, or 3.

Mr. ANDERSEN, Miss CULLEN, Mr. ROSE, and Mr. WAGNER.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151. MODERN SYNTHETIC GEOMETRY.—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers. Credit 3.

3 class hours.

Mr. ANDERSEN.

Prerequisite, Mathematics 30.

162. STATISTICS.—The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability curve, probable error, sampling, reliability. Credit, 3.

3 class hours.

Mr. WAGNER.

Prerequisite, Mathematics 10 or 27.

166. INTRODUCTION TO HIGHER GEOMETRY.—A study of various methods employed in the modern treatment of geometry of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometries will be considered. Given in alternate years, beginning 1951-52. Credit, 3.

Prerequisite, Mathematics 30.

Mr. ANDERSEN.

171. VECTOR ANALYSIS.—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years, beginning 1952-53. Credit, 3.

Mr. ANDERSEN.

172. HISTORY OF MATHEMATICS.—A study of mathematics as it has developed historically. Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years, 1952-53. Credit, 3.

3 class hours.

Mr. ROSE.

Prerequisite, Mathematics 30.

192. DIFFERENTIAL EQUATIONS.

Credit, 3.

3 class hours.

THE STAFF.

Prerequisite, Mathematics 30.

194. ADVANCED CALCULUS.—A continuation of Mathematics 191.—Line and surface integrals; Taylor's expansion; Fourier series; calculus of variations; Elliptic, Gamma and Beta functions; continuity of theorems.

3 class hours.

Credit, 3.

Prerequisite, Mathematics 91.

THE STAFF.

COURSES FOR MINOR CREDIT ONLY

155. MATHEMATICS OF FINANCE.—The mathematical principle of simple and compound interest; annuities, depreciation, valuation of bonds, insurance, building and loan associations. The development and application of aids to computation in problems arising from financial transactions. Credit, 3.

Prerequisite, Mathematics 8 or 10.

Mr. BOUTELLE.

160. SPHERICAL TRIGONOMETRY AND SOLID ANALYTICAL GEOMETRY.—The trigonometry of the sphere with application to terrestrial and celestial prob-

lems. This is followed by a study of higher plane curves and the analytic representation of points, lines and surfaces in space. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, Mathematics 30.

Mr. BOUTELLE.

165. THEORY OF EQUATIONS.—An introduction to advanced algebra. A discussion of the conditions for and methods of solving algebraic and transcendental equations; ruler and compass construction; systems of equations; determinants and matrices; symmetric functions; resultants; discriminants; invariants; the fundamental theorem of algebra. Given in alternate years, beginning 1951-52.

Credit, 3.

Mr. BOUTELLE.

191. INTERMEDIATE CALCULUS.—Series, expansion of functions, partial differentiation, envelopes and multiple integrals.

Credit, 3.

3 class hours.

THE STAFF.

Prerequisite, Mathematics 30.

Mechanical Engineering

MAURICE E. BATES, major adviser.

At least 12 credits (including thesis) must be obtained in the bracket of courses open to graduate students only.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. ADVANCED THERMODYNAMICS.—Advanced course in engineering applications of thermodynamics, including a survey of the physical treatment of thermodynamics.

Credit, 3.

Prerequisite, M. E. 164.

Mr. ATHERTON and Mr. SWENSON.

202. ADVANCED THERMODYNAMICS.—A continuation of the work in 201. Mechanical engineering problems in thermodynamics.

Credit 3.

Prerequisite, M. E. 201.

Mr. ATHERTON and Mr. SWENSON.

221. HEAT TRANSFER.—Fundamentals of heat transfer by convection, conduction and radiation, with engineering applications.

Credit, 3.

Prerequisite, M. E. 164.

Mr. WOLOWICZ and Mr. ATHERTON.

231. ADVANCED INTERNAL COMBUSTION ENGINES.—Theoretical consideration of fuels, combustion, detonation, lubrication, supercharging, carburetion, and fuel injection as related to gasoline and Diesel engines.

Credit, 3.

Prerequisite, M. E. 177.

Mr. DITTFACH.

234. GAS TURBINES.—Thermodynamic principles, performance and application of gas turbines as primary and auxiliary power units.

Credit, 3.

Prerequisite, M. E. 164.

Mr. WOLOWICZ and Mr. SWENSON.

241. ADVANCED DYNAMICS.—Vibration and stability of systems with many degrees of freedom, normal modes and frequencies; approximate methods. Non-linear systems, self excited vibrations. Gyroscopic effects in mechanical systems. Selected topics of applications to problems in engineering.

Prerequisite, M. E. 185.

Credit, 3.

Mr. WOLOWICZ.

250. ADVANCED FLUID MECHANICS.—Unsteady flow in one-dimension fluid vibrations; general analytical relations; steady two-dimensional incompress-

sible flow; steady two-dimensional compressible flow; general analytical relations for viscous flow; vector analysis in flow studies. Credit, 3.
Prerequisites, M. E. 182 and Math 192 (or concurrently). Mr. WOLOWICZ.

254. LUBRICATION AND BEARINGS.—Derivation of a generalized Reynold's equation and its application to analysis of sliders, titled pad bearings, journal bearings, partial bearings, and thrust bearings, thermal equilibrium in bearings, bearing loads and design practices. Credit, 3.
Prerequisites, M. E. 186 and C. E. 76. Mr. BATES and Mr. WOLOWICZ.

300. THESIS. Credit, 3-8.
Prerequisite, Approval of Department. THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

172. FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are then applied to the study of the iron-iron carbide diagram, the S-curve, heat treatment of steel and the properties and uses of the other principal engineering metals. Laboratory work stresses metallographic and radiographic technique. Credit, 3.
Two class hours, one 3-hour laboratory period. Mr. KEYSER.
Prerequisite, M. E. 59 or Chemistry 166.

175. STEAM POWER PLANTS.—This course is a study of the steam power plants, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, problems involved in design and operation. Credit, 3.
Three class hours, one 2-hour laboratory period.
Prerequisite M. E. 164. Mr. SWENSON and Mr. ATHERTON.

176. REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied. Credit, 3.
Two class hours, one 3-hour laboratory period. Mr. SWENSON and Mr. ATHERTON.

Prerequisite, M. E. 164.

177. INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included. Credit, 3.
Three class hours. Mr. DITTFACH and Mr. CARD.
Prerequisite M. E. 164.

182. FLUID DYNAMICS AND MACHINERY.—Steady one-dimensional compressible flow; compressible flow in channels with friction and heat transfers; boundary layer flow, turbulence, and energy losses; general features of dynamic fluid machines; axial flow fans, pumps, and compressors; centrifugal fans, pumps, and compressors; fluid couplings and torque converters; jet compressors and jet pumps; turbines. Credit, 3.
Prerequisite, C. E. 76. Mr. WOLOWICZ.

185. DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine

containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers. Credit, 3.

Three class hours.

Mr. WOLOWICZ.

Prerequisites, C. E. 52, M. E. 168.

186. **ADVANCED MACHINE DESIGN.**—A continuation of Course 183. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course. Credit, 3.

Two class hours, one 3-hour laboratory period.

Mr. BATES.

Prerequisite, M. E. 183.

188. **STEADY FLOW MACHINERY.**—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus. Credit, 3.

Three class hours.

Mr. SWENSON.

Prerequisites, M. E. 164 or 166, and C. E. 76.

190. **ADVANCED METALLURGY.**—Mechanical metallurgy covering the behavior of metals in the plastic state; the shaping of metals by mechanical means such as drawing, rolling, spinning, etc.; the primary methods of metal fabrication such as casting, welding, powder metallurgy, electroforming; the metallurgical applications of radiography. Credit, 3.

Two class hours, one 3-hour laboratory period.

Mr. KEYSER.

Prerequisite, M. E. 172.

Industrial Engineering

175. **JOB EVALUATION.**—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies. Credit, 2.

Three class hours.

Mr. WEAVER.

Prerequisite, I. E. 51.

176. **TIME STUDY.**—A study of the principles involved in the establishment of production standards and their application in the management functions of cost accounting, estimating, production control, incentives, budgetary control. Two class hours, one 3-hour laboratory period. Credit, 3.

Mr. WEAVER.

Prerequisites, I. E. 175, 182 concurrently except for Business Administration majors.

177. **PRODUCTION CONTROL.**—A study of the principles used to regulate production activities in keeping with the manufacturing plan. Credit, 3.

Three class hours.

Mr. EMERSON.

Prerequisite, I. E. 51.

178. **FACTORY PLANNING AND LAY-OUT.**—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation. Credit, 2.

One class hour, one 3-hour laboratory period.

Mr. SOBALA.

Prerequisites, M. E. 2 and I. E. 51.

180. **PLANT BUDGETARY CONTROL.**—A study of the principles used to predetermine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant. Credit, 3.

Three class hours.

Prerequisite, I. E. 51.

Mr. WEAVER.

182. WORK SIMPLIFICATION.—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

One class hour, one 3-hour laboratory period.

Credit, 2.

Prerequisites, M. E. 168 and I. E. 176 concurrently.

Mr. WEAVER.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Electrical Engineering 201, 202. ADVANCED ENGINEERING ANALYSIS.

Credit, 3 each semester.

Mr. ROYS and STAFF.

COURSES FOR MINOR CREDIT ONLY

163. ENGINEERING THERMODYNAMICS.

Credit, 4.

THE STAFF.

164. ENGINEERING THERMODYNAMICS.

Credit, 3.

THE STAFF.

165, 166. HEAT ENGINEERING I AND II.

Credit, 3 each semester.

Mr. LONGSTAFF.

167. MECHANICAL INSTRUMENTATION LABORATORY.

Credit, 1.

Mr. WOLOWICZ, Mr. DITTFACH, Mr. CARD.

168. KINEMATICS.

Credit, 3.

Mr. BATES, Mr. SOBALA.

179, 180. MECHANICAL ENGINEERING LABORATORY.

Credit, 2 each semester.

Mr. WOLOWICZ, Mr. SWENSON and STAFF.

183. MACHINE DESIGN.

Credit, 3.

Mr. BATES.

Industrial Engineering

151. INDUSTRIAL MANAGEMENT.

Credit, 3.

Mr. WEAVER.

186. INDUSTRIAL MANAGEMENT.

Credit, 3.

Mr. EMERSON.

Olericulture

GRANT B. SNYDER, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. LITERATURE.—A critical study and analysis of selected scientific papers and reports of past and current research involving vegetable crops. Credit, 3.
Lectures and assigned readings. Mr. LACHMAN.

Horticulture 203. EXPERIMENTAL METHODS FOR HORTICULTURAL CROPS.—A study of the basic concepts of field plot techniques and the statistical analysis of research as applied to horticultural crops. Given in alternate years, beginning 1952-53. Departments of Floriculture, Olericulture, and Pomology cooperating. Required of all students majoring in
Floriculture, Olericulture, and Pomology. Credit, 3.

Mr. FRENCH, Mr. WHITE and Mr. LACHMAN.

Horticulture 211, 212. SEMINAR.—Each student will be required to present papers on assigned readings related to research work in Horticulture. Departments of Floriculture, Olericulture, and Pomology cooperating.

Credit, 1 each semester.

THE STAFF.

300. THESIS.—Research on some approved topic relating to a specific phase of Olericulture.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

152. ADVANCED COMMERCIAL CULTURE.—A critical analysis of the factors involved in the commercial culture of vegetable crops including soils, nutrition and the relationship of temperature, light and humidity to production techniques and practices both out of doors and in the greenhouse.

Credit, 3.

Lectures and laboratory.

Mr. SNYDER.

173. MARKETING AND STORAGE OF VEGETABLE CROPS.—A detailed evaluation of factors which may be involved in the market and storage handling of vegetables with particular emphasis on their relationship to quality and deterioration.

Credit, 3.

Mr. SNYDER.

175. ADVANCED SYSTEMATIC OLERICULTURE.—A critical study of vegetable plants as to plant characteristics, nomenclature, identification and classification.

Credit, 3.

Mr. SNYDER.

176. ADVANCED VEGETABLE PLANT IMPROVEMENT.—A detailed study of the methods and techniques used in the development of improved types and varieties of vegetables. Attention is also given to methods of seed production and maintenance of varieties.

Credit, 3.

Lectures.

Mr. LACHMAN and Mr. YOUNG.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 163. CHEMISTRY OF THE SOIL.

Credit, 3.

Mr. STECKEL.

Plant Breeding 152. ADVANCED PLANT BREEDING.

Credit, 3.

Mr. FRENCH.

COURSES FOR MINOR CREDIT ONLY

151. PRINCIPLES OF OLERICULTURE.

Credit, 3.

Mr. TUTTLE.

174. MARKETING PRACTICES.

Credit, 3.

Mr. SNYDER.

178. COMMERCIAL OLERICULTURE.

Credit, 3.

Mr. SNYDER.

Philosophy

HARRY N. GLICK, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

266. PHILOSOPHY OF EDUCATION.—An evaluation of various educational theories and practices viewed in the light of historical perspective and contemporary thought.

Credit, 3.

Mr. GLICK.

267. ORIENTAL PHILOSOPHY.—A study of oriental thought, and its influence upon the modern cultures and ideologies of the Orient—primarily India, China, and Japan.

Credit, 3.

Mr. GLICK.

271. SOCIAL PHILOSOPHY.—Starting with an analysis of the present world situation, attention will be given to conflicting claims regarding the basis on which social orders are to be criticized. An attempt will be made to formulate a philosophical foundation for democratic society.

Credit, 3.

Mr. SHUTE.

286. CONTEMPORARY PHILOSOPHY.—Representative thinkers of the twentieth century will be read, including Bergson, Dewey, Whitehead, and others selected in conference with the class.

Credit, 3.

Mr. SHUTE.

289, 290. SEMINAR.—Conferences and reports on special studies in philosophy.

Credit, 1-3.

THE STAFF.

300. THESIS.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

(These courses require extra work for 3 credits)

163. LOGIC.—A study of the principles, problems, and methods of critical thinking with applications to current problems.

Credit, 2-3.

Mr. GLICK.

164. ETHICS.—A survey of ethical theories both historical and contemporary, and an attempt to evaluate these with reference to modern ethical problems.

Credit, 2-3.

Mr. GLICK.

181. PHILOSOPHY OF RELIGION.—A critical and constructive study of the nature of religion; its various forms; its function in human life; the problem of knowledge as it is related to religious faith.

Credit, 2-3.

Mr. SHUTE.

182. AESTHETICS.—An analysis of aesthetic experience; the objective and subjective character of beauty; the meaning of art in its major expressions; the principles of criticism.

Credit, 2-3.

Mr. SHUTE.

183. READINGS IN ANCIENT PHILOSOPHY.—Selections from the works of Plato and Aristotle are critically considered with respect to their formative influence in the history of western thought.

Credit, 2-3.

Mr. SHUTE.

184. READINGS IN MODERN PHILOSOPHY.—Selections read from representative philosophers of the seventeenth to the nineteenth centuries who have set the main problems for modern thought. Attention is given to the relation of science and philosophy in the development of modern world views.

Credit, 2-3.

Mr. SHUTE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Government 171. ANCIENT AND MEDIEVAL POLITICAL THOUGHT. Credit, 3
Mr. MITCHELL.

Government 172. MODERN POLITICAL THOUGHT. Credit, 3.
Mr. MITCHELL.

COURSE FOR MINOR CREDIT ONLY

162. HISTORY OF PHILOSOPHY.—A survey of western thought from the early Greeks to the present.

Credit, 3.

Mr. GLICK and Mr. SHUTE.

Physical Education for Men

WARREN P. MCGUIRK, major adviser.

Work at the graduate level is based upon thorough preparation in the biological sciences, physical sciences, social sciences and related subjects, and in the fundamentals of education.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

239. CORRECTIVE PHYSICAL EDUCATION.—Consideration of the organization of corrective or adaptive recreative program for the physically handicapped.

Credit, 3.

Mr. RICCI.

Prerequisites, Biology (Zoo. 1 and Botany 1), physiology (Zoo. 35), Physics 25, P. E. 76, 178.

251. RECREATION SURVEYS.—Study of community surveys; evolving standards, interpretation and presentation of data; and development of program plans based on survey data.

Credit, 2.

Prerequisite, P. E. 173.

Mr. BRIGGS.

260. SEMINAR IN PHYSICAL EDUCATION.—Physical Education theory and philosophy involving intensive study of the works of eminent authors who have made fundamental contributions to the field; the philosophical factors underlying past and future considerations of health and physical education; special attention is given to the various forces influential in changing one's philosophy of health and physical education.

Credit, 1-3.

Prerequisites, P. E. 45, or 154, 156.

Mr. MCGUIRK.

261. RESEARCH TECHNIQUES IN HEALTH AND PHYSICAL EDUCATION.—Selecting and defining possible problems in health and physical education; methods of scientific research; criticism of studies in light of the canons of scientific method; nature and standards of research for advanced degrees. Credit, 3.
Prerequisites, P. E. 171 or 172, 154, 44. Mr. SALWAK.

262. INTEGRATION OF PHYSICAL EDUCATION AND THE PHYSICAL AND BIOLOGICAL SCIENCES.—The inter-relationship of anatomy, physiology, chemistry, physics, biology to physical education. Collecting and classifying scientific facts which form the foundations of policies, principles, objectives and standards of physical education. Credit, 3.
Prerequisites, P. E. 76, 178. Mr. SALWAK.

264. TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION.—Critical study of tests and measurements available in physical education; methods of constructing and evaluating new tests and measurements; includes sampling, tests of significance, analysis of variance and other statistical methods. Credit, 3.
Prerequisite, P. E. 44. Mr. SALWAK.

285. THE HISTORY AND TRENDS OF PHYSICAL EDUCATION.—An interpretation of the traits, customs and beliefs which have influenced the development of Physical Education and a condensed evaluation of the several systems prevailing today. Credit, 2.
Prerequisites, P. E. 45, 156, Education 151. Mr. LORDEN.

300. THESIS.—Selecting, defining, and studying a problem in physical education, athletics, health, safety education, or recreation. Use of scientific method as applied to the field. Credit, 8.
THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

In addition to the standard requirements of the courses, graduate students must work on a special project requiring research with a resultant term paper.

154. SPECIAL METHODS—SECONDARY SCHOOL PHYSICAL EDUCATION.—This course includes the objectives, significance, organization and content of physical education in junior and senior high school. The course is correlated with the requirements of the State Department of Education. Credit, 3.
Mr. DERBY.

156. PHYSICAL EDUCATION ORGANIZATION AND ADMINISTRATION.—Problems and procedures in physical education, organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas. Credit, 3.
Mr. MCGUIRK.

171, 172. SPECIAL PROBLEMS IN PHYSICAL EDUCATION.—Presentation and discussion of research work in physical education, physical recreation, health and safety education or athletics. Credit, 3 each semester.
Mr. GORE, Mr. SALWAK and the STAFF.

173. RECREATION.—ORGANIZATION AND ADMINISTRATION.—Administrative organization and relationships of public recreation, administration of a recreation department and related problems of recreation administration. Credit, 3.
Mr. GORE.

174. RECREATION LAND USE.—Recreational resources—recreational needs of the people—geography of recreation—some competitors of recreational land use—economic aspects of recreation—federal lands, state, interstate and local systems—park educational work—the national plan.
Credit, 3.

Mr. GORE.

178. KINESIOLOGY.—Mechanics of Exercise.

Credit, 3.

Mr. KAUFFMAN.

186. DRIVER EDUCATION AND DRIVER TRAINING.—Given in cooperation with the State Registry of Motor Vehicles and the State Department of Education, covers development of driver training; objectives, scope, content, and problems; teaching materials; school responsibilities in traffic safety and driver training; securing public support; organization of course content; psycho-physical tests; skill-developing exercises; road tests; motor vehicle construction, operation, and maintenance; rules of the road, and advanced driving practices; administrative standards; visual aids; equipment; practice teaching and behind-the-wheel instruction.
Credit, 2.

Mr. MASI.

Physics

COURSES FOR MINOR CREDIT ONLY

151, 152. MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS.—Course 151 deals largely with direct currents; Course 152 with alternating currents, applications of thermionics, and photo-electricity.

Two class hours, one 2-hour laboratory period.

Credit, 3 each semester.

Prerequisites, Physics 26 and Math. 29.

Mr. POWERS.

155, 156.—MECHANICS.—Development of the fundamental concepts of classical dynamics with applications to particles and rigid bodies in translation and rotation.

Credit, 3 each semester.

Prerequisites, Physics 26 and Math. 30.

Mr. ROSS.

160. SOUND AND ACOUSTICS.—A study of the vibrations, vibrating bodies, coupled systems, sound structure, and acoustic properties.

Credit, 3.

Prerequisite, Physics 155 or equivalent.

Mr. ALDERMAN.

161, 162. HEAT AND THERMODYNAMICS.—A study of heat exchanges and energy changes due to heat in systems of matter.

Credit, 3 each semester.

Two class hours, one 2-hour laboratory period.

Mr. ALDERMAN.

163, 164. OPTICS.—An intermediate course in the theory of light. Geometrical and physical optics.

Credit, 3 each semester.

Two class hours, one 2-hour laboratory period.

Mr. ALDERMAN.

175, 176. ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.—These courses are largely experimental and the subject matter is adapted to the needs of the individual student.

Credit, 3 each semester.

One class hour, two 2-hour laboratory periods.

Mr. WANNLUND.

Prerequisites, Physics 151, 152 or 155, 156 or 163, 164; and Math. 29 and 30.

185, 186. MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions. Given in alternate years, beginning 1951-52.

Credit, 3 each semester.

Prerequisites, Physics 151, 162 and 164 or equivalent; Math. 29 and 30.

Mr. ROSS.

195, 196. **ELECTRONICS.**—Given in alternate years beginning 1952-53.
Prerequisites, Physics 151, 152; Math. 29 and 30. Credit, 3 each semester.
Mr. POWERS.

Poultry Science

FRED P. JEFFREY, major adviser.

The Master of Science degree is offered in the field of genetics and physiology only.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

202. **POULTRY RESEARCH PROBLEMS.**—A critical review of research in genetics or physiology. Required is a comprehensive written report covering some particular phase of the science from its beginning to the present. The final report requires that the student evaluate work in the field and suggest new and unexplored areas.
Credit, 3.

Mr. HAYS, Mr. SMITH, or Mr. JEFFREY.

Prerequisites are standard undergraduate courses in poultry husbandry.

203. **ADVANCED GENETICS.**—A lecture course dealing with the experimental study of genetics in plants and animals. The major aspects of the science are discussed and illustrated to give the student a good working knowledge and to stimulate his interest in this field of biology.
Credit, 3.

3 class hours.

Mr. HAYS.

Prerequisites, at least one year's training in biology and Zoology 153 or its equivalent.

204. **ADVANCED GENETICS.**—A continuation of Poultry 203. The first third of the semester will be devoted to human genetics and the last two-thirds to the application of the latest statistical methods in the interpretation of biological data.
Credit, 3.

3 class hours.

Mr. HAYS.

205. **AVIAN GENETICS.**—A lecture course covering the genetics of the principal domesticated birds. Special attention is given to methods of experimentation and interpretation of genetic data.
Credit, 3.

Mr. SMYTH.

Prerequisites, at least one year's training in biology and Zoology 153 or its equivalent.

206. **AVIAN GENETICS AND PHYSIOLOGY.**—This course is a continuation of Poultry 205. Special emphasis will be put on the fields of physiological and population genetics as they apply to poultry genetics and breeding. The physiology of reproduction of avian species will also be considered in detail.
Credit, 3.

3 class hours.

Mr. SMYTH.

207. **SPECIAL PROBLEMS.**—Research problems in avian genetics and physiology. Problems such as heat tolerance, metabolism of chicks, factors affecting feathering have been carried out in the past and are mentioned here to illustrate the type of problem that might be undertaken.
Credit, 3.

Mr. HAYS, Mr. SMYTH, or Mr. JEFFREY.

300. **THESIS.**

Credit, 10.

THE STAFF.

COURSE FOR MINOR CREDIT ONLY

201. **ADVANCED POULTRY HUSBANDRY.**—A critical review of research in any one of these fields: (a) genetics and physiology, (b) nutrition, (c) marketing, or (d) incubation and brooding. Three written reports and a comprehensive final examination are required. This course is designed for teachers of vocational agriculture.

Credit, 3.

THE STAFF.

Prerequisites are standard undergraduate courses in poultry husbandry.

Psychology

CLAUDE C. NEET, major adviser.

The student majoring in Psychology may orient his program toward either a terminal Master's degree or toward general preparation for doctorate study in Psychology elsewhere. Emphasis may be in the areas of general experimental psychology, personality and social psychology, or in the applied fields of clinical, industrial and vocational tests and measurements.

Students applying for admission on full status should, in addition to meeting the requirements of the Graduate School, have taken the Introductory course, 21 undergraduate credits in Psychology including a course in experimental psychology and a course in statistics. In case the student has not taken this number of credits or lacks these courses, he may be allowed to make up the deficiencies in the Undergraduate School of the University. In exceptional cases students with entrance deficiencies may, at the end of one semester's study, petition the Department to waive remaining undergraduate deficiencies. In completing his application, the student should arrange to take the Miller Analogies Test, Form H, and have his score submitted.

All students qualifying for the Master of Science degree in Psychology must in addition to meeting the requirements of the Graduate School for the degree, pass a written examination. This examination will cover certain general fields of Psychology selected by the Department and certain special fields which may be chosen by the candidate.

Students electing Psychology 300 (Thesis) must take a final oral examination given by the Department covering their thesis work.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. **NEURAL CORRELATES.**—A detailed study of the neuroanatomical relationships of sensory-motor systems. Emphasis is placed upon the major fiber systems and their role in behavior. Given in alternate years, beginning 1952-53. Prerequisites, 6 hours Psychology and 6 hours Zoology or the equivalent.

Credit, 2.

Mr. FELDMAN.

204. **LEARNING AND MOTIVATION.**—A consideration of basic laws of learning and motivation, and of their implications for explaining complex behaviors. Prerequisite, Psychology 51.

Credit, 2.

Mr. Goss.

205. **DISCRIMINAL PROCESSES.**—An analysis of sensory and perceptual processes. The relationships among physical, physiological and psychological variables are stressed. Given in alternate years, beginning 1951-52. Prerequisites, 6 hours Psychology and 6 hours Zoology or the equivalent.

Credit, 3.

Mr. FELDMAN.

214. **THEORY AND CONSTRUCTION OF PSYCHOLOGICAL TESTS.**—A study of methods, concepts, and statistical procedures employed in constructing and evaluating psychological measuring devices. Credit, 2.

Prerequisite, Psychology 175.

Mr. RONAN.

222. **THEORIES OF PERSONALITY.**—Several theories of the nature, development and functions of the normal personality are critically reviewed. The following general theories and their variants will be studied: psychoanalysis, personalism, phenomenology, factor theory, and behaviorism. Given in alternate years, beginning 1952-53. Credit, 2.

Prerequisites, any two of the following: Psychology 161, 184, 194.

Mr. VALLANCE.

223. **ADVANCED SOCIAL PSYCHOLOGY.**—Several special topics in Social Psychology are selected for intensive study through the literature and experimentation. Among the topics considered are: attitude measurement, propaganda, rumor, and socialization of motives. Credit, 2.

Prerequisite, Psychology 161 or 162.

Mr. VALLANCE.

225. **ADVANCED ABNORMAL PSYCHOLOGY.**—An intensive study of the behavior disorders and their relationships to normal behavior. Major emphasis is on theories of etiology and symptom formation, and on general problems of therapy. Credit, 3.

Prerequisite, Psychology 183.

Mr. NEET.

246. **PSYCHOLOGY OF THE PRE-SCHOOL CHILD.**—A detailed study of the behavior and characteristics of the child from the early prenatal period to the school age. Given in alternate years, beginning 1951-52. Credit, 2.

Prerequisite, Psychology 194.

Mr. NEET.

265. **PROJECTIVE TECHNIQUES.**—A survey of the history, theory, and development of the projective method in personality investigation. Techniques to be studied include the Rorschach, Thematic Apperception, Sentence Completion, Picture-Frustration, Szondi, and others. Credit, 3.

Prerequisites, Psychology 181 and 183.

Mr. KRASNER.

268. **CLINICAL PRACTICUM.**—Supervised practice in the diagnostic and therapeutic procedures used by the psychologist in a clinical setting. Students electing this course will take their practicum training in the Northampton State Hospital during specified hours. Credit, 3.

Prerequisite, Psychology 163 or 265.

Mr. KRASNER and Dr. MICHELSON.

289. **PROBLEMS IN PSYCHOLOGY.**—Affords an opportunity for individual study in any special field of Psychology not considered in other courses. Weekly conferences. Credit, 1-6.

THE STAFF.

300. **THESIS.**—Students planning eventually to study for the doctorate in Psychology are advised to elect this course. Maximum Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

156. **EDUCATIONAL PSYCHOLOGY.**—A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are: Physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil. Credit, 3.

Prerequisite, Psychology 26.

Mr. VALLANCE.

161. **SOCIAL PSYCHOLOGY.**—The social behavior of the individual. Topics considered will include methods of studying social behavior, "schools" of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, customs and conformity. Credit, 3.

Prerequisite, Psychology 26.

Mr. VALLANCE.

162. **SOCIAL PSYCHOLOGY.**—A survey of multiindividual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion, behavior in crowd situations, social conflict and prejudice. Given in alternate years, beginning 1951-52. Prerequisite, Psychology 161 or the consent of the instructor. Credit, 3.

Mr. VALLANCE.

163. **PHYSIOLOGICAL PSYCHOLOGY.**—A study of the relationships between the individual's behavior and his physiological processes. Emphasis will be placed on sensory and motor phenomena, drives, emotional behavior, and learning. Credit, 3.

Prerequisite, 6 units of Psychology; Zoology 35.

Mr. FELDMAN.

172. **ADVANCED EXPERIMENTAL PSYCHOLOGY.**—Experimental design, techniques, and apparatus in psychology are considered, and selected projects are carried out individually by the members of the class. Credit, 3.

Prerequisite, Psychology 51.

Mr. NEET.

175. **PSYCHOLOGICAL STATISTICS.**—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields. Credit, 3.

Prerequisite, One semester of statistics, or the equivalent.

Mr. GOSS.

181. **PSYCHOLOGICAL TESTS, GENERAL.**—A survey of the construction, development, and use of a variety of psychological tests. Emphasis will be placed upon the administration, scoring, interpretation and evaluation of tests of personality, interests, aptitudes, and group tests of intelligence. Credit, 3.

Prerequisite, Psychology 26.

Mr. KRASNER.

182. **PSYCHOLOGICAL TESTS, INDIVIDUAL INTELLIGENCE TESTS.**—Theories as to the nature and measurement of intelligence. Emphasis is on the administration, scoring and interpretation of individual intelligence tests such as the Stanford-Binet, Wechsler-Bellevue, Merrill-Palmer, and others. Credit, 3.

Prerequisite, Psychology 181.

Mr. KRASNER.

183. **ABNORMAL PSYCHOLOGY.**—A study of abnormal behavior. Attention is given to the following: dynamics of behavior abnormalities, the neuroses, psychoses, mental deficiency, speech problems, and sensory and motor disorders. Credit, 3.

Prerequisite, Psychology 26.

Mr. NEET.

186. **INDUSTRIAL PSYCHOLOGY.**—The course aims to give understanding of psychological principles and methods in business and industrial situations. Topics considered include: employee selection and training, motivation and morale, design of machines and equipment, working conditions, fatigue, accident prevention, and advertising and selling. Credit, 3.

Prerequisite, Psychology 26.

Mr. RONAN.

188. **PSYCHOLOGY OF GUIDANCE.**—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases. Credit, 3.

Prerequisite, Psychology 181.

Mr. ———.

190. CONTEMPORARY PSYCHOLOGIES.—An introductory historical, logical and systematic analysis of contemporary psychological theories. Credit, 3.
Prerequisite, Psychology 26. Mr. Goss.

192. CLINICAL PSYCHOLOGY.—A study of the development, and present status of the techniques and methods used by the psychologist in the diagnosis and treatment of behavior disorders. Consideration is given to the use of diagnostic tests, psycho-therapy, and the general role of the clinical psychologist. Credit, 3.
Prerequisite, Psychology 184. Mr. KRASNER and Dr. MICHELSON.

193. ADOLESCENT PSYCHOLOGY.—The application of the basic principles of learning, primary and secondary motivation, frustration and conflict to the facts and problems of adolescent behavior. Given in alternate years, beginning 1952-53. Credit, 3.
Prerequisite, Psychology 26. Mr. Goss.

194. CHILD PSYCHOLOGY.—The course aims to develop an understanding of the behavior of the child. Psychological aspects of the following are considered: Original nature, maturation, play, social behavior, personality and mental hygiene. Nursery school observation and practice. Credit, 3.
Prerequisite, Psychology 26. Mr. NEET.

Pomology

ARTHUR P. FRENCH, major adviser

All students majoring in this department are required to offer a thesis as part of their major requirements.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201, 202. POMOLOGICAL RESEARCH.—A critical review of past and current research work in the field of pomology. Topics selected according to the interests and needs of the individual student. Credit, 2 each semester.
Prerequisite, Pomology 181 and 182. Mr. SOUTHWICK and the STAFF.

Horticulture 203. EXPERIMENTAL METHODS.—A study of the basic concepts of field plot techniques and the statistical analysis of research data as applied to horticultural crops. This course is given by the Departments of Pomology, Floriculture and Olericulture. Required of all graduate students majoring in Floriculture, Olericulture, and Pomology. Credit, 3.
Given in alternate years, beginning 1952-53. Mr. FRENCH, Mr. WHITE, and Mr. LACHMAN.

205. ADVANCED SYSTEMATIC POMOLOGY.—An intensive study of leaf and tree characters of nursery and orchard trees with reference to identification and the relationship of varieties. This work to be undertaken in the summer. Credit, 3.
Prerequisite, Pomology 175. Mr. FRENCH.

Horticulture 211, 212. SEMINAR.—Each student will present papers on assigned topics in Horticulture. Departments of Pomology, Floriculture and Olericulture cooperating. Required of all graduate students majoring in Floriculture, Olericulture, and Pomology. Credit, 1 each semester.

THE DEPARTMENTS.

300. THESIS.—Each student majoring in Pomology will be required to carry out an original investigation on an approved problem and present the results thereof in satisfactory form as a thesis. Maximum credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181, 182. ADVANCED POMOLOGY.—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants. Credit, 3 each semester.
Prerequisite, Pomology 53.

Mr. FRENCH, Mr. SOUTHWICK and Mr. WEEKS.

Plant Breeding

Plant Breeding 152. ADVANCED PLANT BREEDING.—An advanced study of genetic topics peculiar to plants together with consideration of the methods and problems of the plant breeder. Credit, 3.

Prerequisite, Zoology 153 or equivalent.

Mr. FRENCH.

Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUES.—The methods of cytology useful to the plant geneticist. Credit, 2.

Mr. FRENCH.

Plant Breeding 182. SPECIAL PROBLEMS IN PLANT BREEDING.—Advanced study of special topics in the field of plant genetics and breeding. Credit, 2.

Prerequisite, Plant Breeding 152.

Mr. FRENCH.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 263. CHEMISTRY OF THE SOIL.

Credit, 3 each semester.

Mr. STECKEL.

COURSES FOR MINOR CREDIT ONLY

156. SPRAYING.

Credit, 3.

Mr. ROBERTS.

175. SYSTEMATIC POMOLOGY.

Credit, 4.

Mr. O. ANDERSON.

177. COMMERCIAL POMOLOGY.

Credit, 3.

Mr. ROBERTS and Mr. J. ANDERSON.

183, 184.—SEMINAR.

Credit, 1 each semester.

THE STAFF.

Public Health

RALPH L. FRANCE, major adviser.

Environmental sanitation: Through the cooperation of the Massachusetts Department of Public Health, provision has been made to offer the following courses, on a graduate level, for a limited number of students interested in environmental sanitation, and who intend to prepare for positions as sanitarians with Federal, State or local health agencies. In addition to the University requirements for admission, applicants as undergraduates must have majored

in the field of chemistry and biology or submit acceptable evidence of equivalent experience as a full-time employee of official or voluntary health agencies.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. PUBLIC HEALTH LAW.—A discussion of the laws governing health activities of federal, state and local health agencies including methods of preparation and mediation of health legislation and regulations. Rules of evidence and conduct of witnesses will be included.

Credit, 3.

Mr. ROBERTSON.

202. METHODS OF PUBLIC HEALTH EDUCATION.—The object of this course is to give the health educator an opportunity to study, use, and evaluate some of the special methods, tools, and skills in health education. Opportunity for practice in the preparation of health education materials is provided.

Credit, 3.

Mr. ROBERTSON.

203. THE PLANNING OF ENVIRONMENTAL SANITATION PROGRAMS.—The practical techniques of putting the principles of environmental sanitation into practice in a health department program are studied. The level of application and the field of application will be determined by the students' own needs. Topics considered are the development of standards, rating systems and field forms, the uses and execution of sanitary surveys, the training of sub-professional sanitarians in areas outside the United States, the planning of schools in food handling, the use of milk-shed rating systems, the job analysis of a balanced sanitation program.

Credit, 3.

THE STAFF.

204. SPECIAL PROBLEMS IN PUBLIC HEALTH.—Special investigational or research problems in public health for advanced students. The scope of this work can be varied to meet specific conditions.

Credit, 3-6.

THE STAFF.

205. SUPERVISED FIELD TRAINING. To be taken during the summer session. All graduates majoring in sanitary technology must complete a prescribed eight-week field training program conducted by the New England Field Training Center under the direction of the Training Division of the Communicable Disease Center, U. S. Public Health Service, with the assistance of the staff and State Department of Health personnel. This course is a prerequisite for placement in federal, state and municipal agencies.

Credit, 6.

THE STAFF.

206. ADVANCED EPIDEMIOLOGY.—Lectures, discussions, and laboratory work on the principles, and methods of epidemiological investigation with laboratory work in assembling and analyzing crude data resulting from field investigations of epidemics.

Credit, 3.

Prerequisite, P. H. 188 or equivalent.

Mr. LEE.

207. SEMINAR.—Lectures and reports on current literature and special topics. (One each semester.)

Credit, 1-2.

THE STAFF.

300. THESIS.—Independent research leading to the preparation of a thesis that will make an original contribution to the literature in public health. Results should be suitable for publication. The thesis is optional for M.S. candidates who have had sufficient training in public health before entering the graduate school to profit more from thesis research than from additional courses.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

161, 162. GENERAL AND COMMUNITY SANITATION.—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation, industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

Credit, 3.

Mr. PERRIELLO or Mr. ROBERTSON.

163. INDUSTRIAL HYGIENE AND SANITATION.
Permission of instructor.

Credit, 3.

Mr. PERRIELLO.

164. MICROSCOPY OF WATER.—Counting and control of plankton in potable waters.

Credit, 3.

Prerequisite, Bact. 31A.

Mr. SNOW.

184. PUBLIC HEALTH ADMINISTRATION.

Credit, 3.

Mr. PERRIELLO.

186. FIELD STUDIES IN SANITATION.—Trips will be taken into the field for the observation of public health practices.

Credit, 2.

Prerequisites, Public Health 161, 162.

Mr. ROBERTSON.

188. EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.—Admission by approval of the instructor.

Credit, 3.

Mr. LEE.

190. SEMINAR.—Lectures and reports on current literature and special topics. (One each semester.)

Credit, 1.

Mr. PERRIELLO.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

Bacteriology 181. GENERAL APPLIED BACTERIOLOGY.

Credit, 4.

Mr. FRANCE.

Bacteriology 182. FOOD BACTERIOLOGY.

Credit, 3.

Miss GARVEY.

Bacteriology 190. SANITARY BACTERIOLOGY.

Credit, 3.

Mr. FRANCE.

Agricultural Economics 179. PRINCIPLES AND METHODS OF STATISTICS.

Credit, 3.

Mr. RUSSELL.

Botany 166. GENERAL MYCOLOGY.

Credit, 3.

Mr. BANFIELD.

Home Economics 203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.

Credit, 3.

Miss MITCHELL.

Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.

Credit, 3.

Miss MITCHELL.

Food Technology 175. FOOD PRESERVATION.	Credit, 3. Mr. NEBESKY.
Food Technology 192. ANALYSIS OF FOOD PRODUCTS.	Credit, 3. Mr. FELLERS and Mr. NEBESKY.
Dairy 152. MARKET MILK.	Credit, 4. Mr. LINDQUIST.
Dairy 209, 210. SEMINAR.	Credit, 1 each semester. Mr. HANKINSON.

With the assistance of a faculty adviser a minimum of six semester courses must be selected from the following which are offered by cooperating departments within the University or by the professional staff of the Massachusetts Department of Public Health. This program, when approved by the Department and the Dean of the Graduate School, will fulfill the student's minor requirements.

Government 162. ADMINISTRATIVE LAW.
 Entomology 174. MEDICAL ENTOMOLOGY.
 Food Technology 175. FOOD PRESERVATION.
 Food Technology 192. ANALYSIS OF FOOD PRODUCTS.
 Forestry 151. FOREST MANAGEMENT OF WATER SHEDS.
 Dairy Industry 152. MARKET MILK.
 Animal Husbandry 153. ELEMENTS OF MEAT PACKING.
 Home Economics 203. ADVANCED NUTRITION—METABOLISM OF MAJOR FOOD-STUFFS.

Chemistry 163. WATER, SEWAGE CHEMISTRY.

Bacteriology 181. APPLIED BACTERIOLOGY.

Public Health Nutrition: With the proper selection of courses students may specialize in a program of graduate study recommended by the American Dietetics Association to qualify as public health nutritionists. This program has been developed in cooperation with the School of Home Economics.

Romance Languages

CHARLES F. FRAKER, major adviser.

Requirements for admission to candidacy for the M. A. in Romance Languages:

1. A working knowledge of Latin.
2. Oral proficiency in at least one of the Romance Languages.
3. A reading knowledge of a second language (Latin, German or another Romance Language).

All candidates for the M. A. degree are required to take either Romance Languages 201-202, or 203-204.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201, 202. AN INTRODUCTION TO ROMANCE PHILOLOGY.—Studies in the laws of vowel and consonantal change; the provenience of words.

Credit, 3 each semester.

Mr. FRAKER.

203, 204. OLD FRENCH READINGS.—Early monuments of French Literature; The Arthurian and Carolingian Cycles. Given as needed.

Credit, 3 each semester.

Mr. GODING and Mr. FRAKER.

205, 206. OLD SPANISH READINGS.—Early monuments of Spanish Literature; The Cronicas and the Pema del mio Cid. Given as needed.

Credit, 3 each semester.

Mr. FRAKER.

209, 210. PROBLEM COURSE.—Independent study of some phase of linguistics or literature.

Credit, 3 each semester.

THE STAFF.

300. THESIS.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151, 152. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY.—Given in alternate years, beginning 1952-53.

Credit, 3 each semester.

Mr. FRAKER.

153, 154. CONTEMPORARY FRENCH LITERATURE.—Given as needed.

Credit, 3 each semester.

Miss CLARKE.

155, 156. FRENCH CLASSICISM.—A survey of the Classic period, with readings from representative works. Given in alternate years, beginning 1951-52. Prerequisites, French 15 and 16 or their equivalent.

Credit, 3.

Mr. FRAKER.

157. FRENCH ROMANTICISM.—A detailed study of the Romantic Period. Readings from Hugo, de Vigny, Lamartine, de Musset, and others. Conducted in French. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisites, French 15 and 16 or their equivalent.

Mr. GODING.

158. FRENCH REALISM.—A detailed study of the Realistic period and the modern writers. Readings from Balzac, Flaubert, Stendhal, Loti, Daudet, Anatole France, and others. Conducted in French. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, French 31.

Mr. GODING.

180. ADVANCED GRAMMAR AND COMPOSITION.—A thorough review of grammar, pronunciation, and the phonetic method. A course for prospective teachers.

Credit, 3.

Mr. GODING.

181. SPANISH ROMANTICISM.—Readings from representative authors; written and oral composition. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisite, a reading knowledge of Spanish.

Mr. FRAKER.

182. THE MODERNISTS.—Dario, Nervo, and their contemporaries; composition and conversation. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, a reading knowledge of Spanish.

Mr. FRAKER.

183, 184. THE GOLDEN AGE.—Readings from Cervantes, Lope de Vega, Calderon, Garcilaso, and others. Composition and conversation. Given in alternate years, beginning 1951-52.

Credit, 3 each semester.

Prerequisites, Spanish 7 and 8.

Mr. FRAKER.

Wildlife Management

REUBEN E. TRIPPENSEE, major adviser.

Graduate work in Wildlife Management is closely tied in with the Cooperative Wildlife Research Station which is now a part of the Department of Forestry and Wildlife Management. Financial support for the Unit is received from the U. S. Fish and Wildlife Service, the Wildlife Management Institute and the State Fish and Game Department. Dr. William G. Sheldon, director of the Research Unit spends approximately half of his time assisting the research activities of the students who work under fellowships received through the Unit. The director of research is automatically on the graduate committee of each student who receives funds through the Unit.

Students graduating in Wildlife Management at the University of Massachusetts are strongly urged to pursue graduate work at another University. Opportunities for fellowships in this field are usually available at other Cooperative Units.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. NORTH AMERICAN ANIMALS.—A review of the taxonomy, life histories and ecological inter-relationships of certain North American vertebrates.

Credit, 3.

Mr. TRIPPENSEE.

202. WILDLIFE ADMINISTRATION.—A study of the organization and operation of state and federal agencies and certain associations concerned with wildlife management.

Credit, 3.

Prerequisite, Wildlife Management 27 or equivalent.

Mr. TRIPPENSEE.

203. WILD ANIMAL ABUNDANCE.—A study of the factors which influence wild animal abundance.

Credit, 3.

Mr. TRIPPENSEE.

204. LAND USE AND WILDLIFE.—A study of agricultural and forestry practices in relation to wildlife.

Credit, 3.

Prerequisites, Agronomy 2, Forestry 55 and 56 or equivalents.

Mr. SHELDON and Mr. TRIPPENSEE.

205. MANAGEMENT OF WET LANDS AND WATER IN RELATION TO WILDLIFE.

Credit, 3.

Mr. SHELDON and Mr. TRIPPENSEE.

300. THESIS.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

170. GAME BIRDS AND MAMMALS.—Life histories, ecology methods of management.

Credit, 3.

Mr. TRIPPENSEE.

171. WATERFOWL MANAGEMENT.—Life histories and factors which affect abundance of waterfowl.

Credit, 3.

Mr. TRIPPENSEE.

173. PREDACEOUS BIRDS AND INJURIOUS RODENTS.—Life histories, ecology and control. Credit, 3.

Mr. TRIPPENSEE.

174. TECHNIQUES IN WILDLIFE MANAGEMENT.—Includes analysis of cover, census methods, food habit studies, and determination of flock and herd age and sex composition of game animals. Credit, 3.

Mr. TRIPPENSEE.

175. MANAGEMENT OF FURBEARERS.—Life histories and management of fur-bearers and nomenclature of the fur trade. Credit, 3.

Mr. TRIPPENSEE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agricultural Economics 179. ELEMENTARY STATISTICS THROUGH SIMPLE CORRELATION. Credit, 3.

Mr. RUSSELL.

Botany 167, 168. INTRODUCTORY PLANT PHYSIOLOGY. Credit, 3 each semester.

Mr. KOZLOWSKI.

Botany 181. PLANT ECOLOGY.

Credit, 3.

Mr. LIVINGSTON.

Entomology 212. GEOGRAPHICAL DISTRIBUTION.

Credit, 3.

Mr. ALEXANDER.

Entomology 190. EVOLUTION.

Credit, 2.

Mr. HANSON.

Entomology 179. ADVANCED ANIMAL ECOLOGY.

Credit, 3.

Mr. SWEETMAN.

Education 166. PREPARATION AND USE OF AUDIO-VISUAL AIDS. Credit, 2-3.

Mr. WYMAN.

Poultry Science. 203, 204. ADVANCED GENETICS. Credit, 3 each semester.

Mr. HAYS.

Zoology 250. SPECIAL PROBLEMS.

Credit, 3-6.

THE STAFF.

Zoology 183. COMPARATIVE PHYSIOLOGY.

Credit, 4.

Mr. BISHOP.

Zoology 184. GENERAL CELLULAR PHYSIOLOGY.

Credit, 4.

Mr. BISHOP.

Zoology 186. FISHERY BIOLOGY.

Credit, 3.

Mr. ANDREWS

Zoology 187. ENDOCRINOLOGY.

Credit, 3.

Mr. SNEDECOR.

Zoology

GILBERT L. WOODSIDE, major adviser.

Applicants for admission to do graduate work in Zoology are required to take the graduate record examination. Students may make arrangements for taking the examination by writing to: Educational Testing Service, Princeton, New Jersey. If the examination has not been taken before the student begins his graduate work, it must be taken during the student's first semester in Graduate School.

A thesis is required of all graduate students in the Department of Zoology who become candidates for the Master's degree.

Candidates who have fulfilled the requirements of the Graduate School and the Department of Zoology will be awarded the Master of Arts degree.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

202. PROBLEMS IN INVERTEBRATE ZOOLOGY.—Invertebrate fauna of local ponds, streams and bogs. Morphology, habits, life cycles and classification of fresh-water protozoans, sponges, flatworms, bryozoans and crustaceans, with a survey of the important literature on each group. Several field trips.

Discussion period and two laboratory periods per week.

Credit, 3.

Prerequisite, Zoology 25 or 170, or equivalent.

Miss TRAVER.

204. PROBLEMS IN PARASITISM.—External and internal parasites of representative animals; preparation of parasites and parasitized organs for study; classification, structure and life cycles of parasites and effect upon their hosts. Seminar reports on recent important phases of parasitology.

Credit, 3.

Discussion period and two laboratory periods per week.

Miss TRAVER.

Prerequisite, Zoology 169 or its equivalent.

220. EXPERIMENTAL EMBRYOLOGY.—Lectures, seminar reports and laboratory work dealing with the chief factors in the mechanics and physiology of development; the germ cells; fertilization, establishment of the primary axis; embryonic induction, and differentiation.

Credit, 3.

Prerequisites, Zoology 172 or equivalent.

Mr. WOODSIDE.

245. ADVANCED VERTEBRATE PHYSIOLOGY.—An opportunity for the student to gain experience in small animal surgery and in making standard experimental preparations. Suitable techniques for recording results will be employed, and the proper interpretation of the acquired data will be stressed.

Credit, 3.

One class hour; one 4-hour laboratory period.

Mr. SNEDECOR.

Prerequisites, Zoology 35 and 171.

248. PHYSIOLOGICAL GENETICS.—The nature of the gene and its action in the developmental and physiological processes of the organism.

Credit, 3.

Prerequisite, Zoology 153.

Mr. RAUCH.

250. SPECIAL PROBLEMS.

Credit, 3 or 6.

THE STAFF.

255. DEPARTMENTAL SEMINAR.

Credit, 2.

THE STAFF.

260. PHYSIOLOGY SEMINAR.

Credit, 1 each semester.

Maximum credit, 3.

Mr. BISHOP.

263. BIOLOGY OF PROTOZOA.—An intensive survey of problems of morphology, physiology, systematics, ecology, and evolution of the Protozoa. The parasitic forms are considered only in so far as they illustrate the ecological and evolutionary trends in the various groups. Credit, 3.

Two lectures and two 2-hour laboratories a week.

Mr. HONIGBERG.

Enrollment limited to 12 students.

Prerequisites: Zoology 1 and permission of the instructor.

300. THESIS.

Credit, 10.

THE STAFF.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

169. ANIMAL PARASITOLOGY.—Important protozoan and helminthic parasites of man and domestic animals. Morphology, physiological activities, classification and phylogeny of the parasites; life cycles, vectors, and modes of transmission; host-parasite relationships, etc. Credit, 3.

Graduate students taking this course are required to prepare a term report of some phase of parasitism. Miss TRAVER.

One class hour; two 2-hour laboratory periods.

Prerequisite, Zoology 1.

170. ADVANCED INVERTEBRATE ZOOLOGY.—A survey of the invertebrate animals, from evolutionary and phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space, are considered, as well as classification. Credit, 3.

One class hour; two 2-hour laboratory periods.

Miss TRAVER.

Prerequisite, Zoology 25 or its equivalent.

173. GENERAL CYTOLOGY.—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and individual laboratory work. Credit, 3.

Prerequisites, Zoology 150 and 51.

Mr. ROLLASON.

174. LIMNOLOGY.—The study of inland waters. Five departments,—geology, public health, botany, entomology and zoology—, are cooperating in the presentation of this course. Credit, 4.

Two class hours; two 3-hour laboratory periods.

Miss TRAVER, Mr. ALEXANDER, Mr. WILSON, Mr. HANSON,

Mr. BARTLETT, Miss SMITH, Mr. ANDREWS, Mr. SNOW, Mr. PUTALA.

Prerequisites, Botany 1, Zoology 1, Chemistry 1 and 2.

Limited to 16 students. Consult Miss Traver for permission to register.

183. COMPARATIVE PHYSIOLOGY.—The physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla. Credit, 4.

Two class hours; two 3-hour laboratory periods.

Mr. BISHOP.

Prerequisites, Zoology 1 and 35.

184. GENERAL CELLULAR PHYSIOLOGY.—Properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, bioelectricity, and reproduction. Credit, 4.

Two class hours; two 3-hour laboratory periods.

Mr. BISHOP.

Prerequisites, one year biology; organic chemistry.

186. FISHERY BIOLOGY.—Theory in the practice of regulating fresh-water fisheries; the physical and biological conditions of the environment and their influence on fish populations. Credit, 3.

Prerequisite, Zoology 181 and permission of the instructor. Mr. ANDREWS.

187. ENDOCRINOLOGY.—The importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.) in a variety of animals. Credit, 3.

Two class hours; one 3-hour laboratory period. Mr. SNEDECOR.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Chemistry 193-194. BIOCHEMISTRY. Credit, 5 each semester.

Mr. TURNER.

Entomology 212. GEOGRAPHICAL DISTRIBUTION.—Geographic distribution of animals and plants, with particular reference to insects, insect migrations.

Credit, 2.

Mr. ALEXANDER.

COURSES FOR MINOR CREDIT ONLY

150. HISTOLOGY OF VERTEBRATES. Credit, 3.

Mr. ROLLASON.

153. GENETICS. Credit, 3.

Mr. RAUCH.

171. COMPARATIVE VERTEBRATE ANATOMY. Credit, 4.

Mr. BARTLETT and Mr. DEARDEN.

172. VERTEBRATE EMBRYOLOGY. Credit, 4.

Mr. DEARDEN, Mr. RAUCH and Mr. WOODSIDE.

180. ORNITHOLOGY. Credit, 3.

Mr. BARTLETT and Mr. NUTTING.

181. VERTEBRATE ZOOLOGY. Credit, 3.

Mr. ANDREWS and Mr. BARTLETT.

185. THE CLASSES OF ARTHROPODS OTHER THAN INSECTS. Credit, 3.

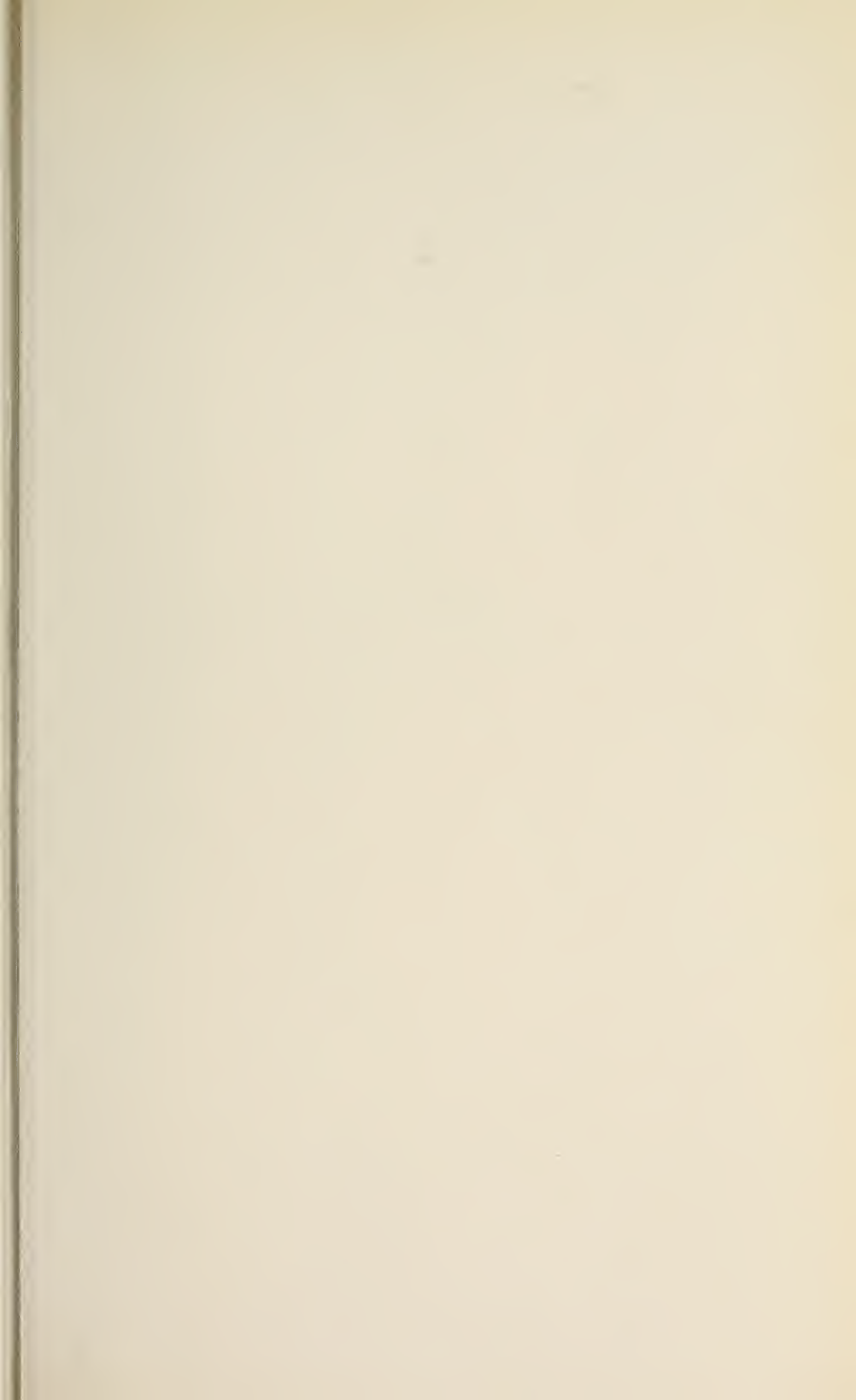
Mr. HANSON.

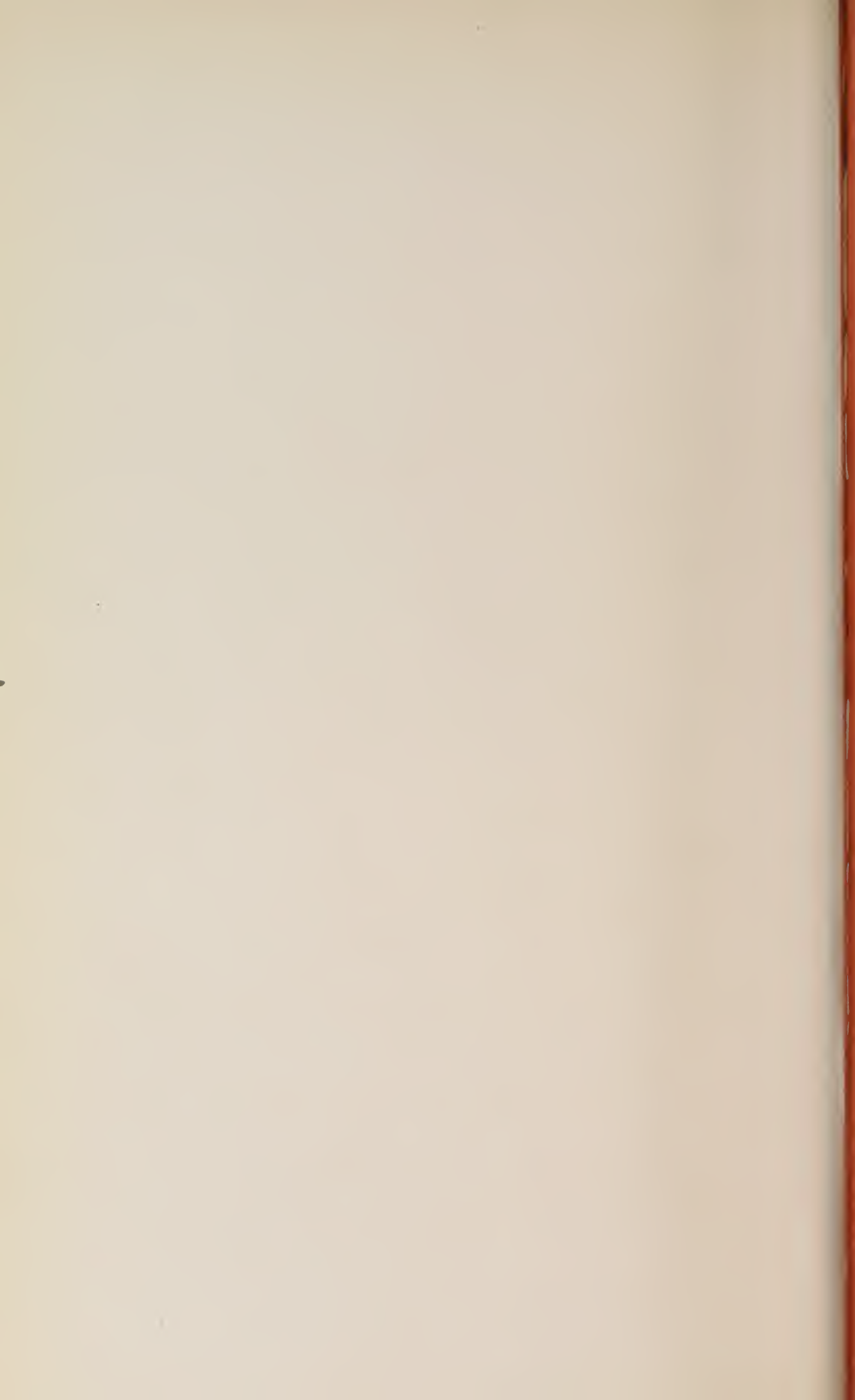
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THE UNIVERSITY OF MASSACHUSETTS

BULLETIN



1951 Summer Session Catalogue
Amherst, Massachusetts

**TWELVE WEEK SUMMER
SESSION • JUNE 18-SEPT. 8**

Albert B. Nelson, Assistant Professor of Geology and Mineralogy
D. Horace Nelson, Assistant Professor of Dairying
Arthur E. Niedeck, Associate Professor of Speech
George J. Oberlander, Instructor in Chemistry
William G. O'Donnell, Associate Professor of English
Charles F. Oliver, Assistant Professor of Education
Robert C. Perriello, Associate Professor of Bacteriology
Elliott S. Pierce, Instructor in Chemistry
Albert W. Purvis, Head, Department of Education
George R. Richason, Assistant Professor of Chemistry
Robert L. Rivers, Instructor in Business Administration
John E. Roberts, Assistant Professor of Chemistry
William W. Ronan, Instructor in Psychology
Henry H. Skillings, Instructor in Mathematics
J. Harold Smith, Professor of Chemistry
Robert A. Turner, Associate Professor of Chemistry
H. Leland Varley, Assistant Professor of English
Robert W. Wagner, Professor of Mathematics
Arthur R. Williams, Assistant Professor of English
Raymond Wyman, Assistant Professor of Education
Mildred B. Stone, Associate Professor, Salem State Teachers College
Helen F. O'Leary, Principal, William Whiting Elementary School, Holyoke

UNIVERSITY OF MASSACHUSETTS

SUMMER SESSION

1951

June 18 - September 8

The University of Massachusetts will conduct a twelve-week Summer Session in 1951. A wide variety of courses in many fields will be offered. These offerings are intended to meet the needs of undergraduate students who wish to accelerate their program or complete courses in specific areas, of graduate students, teachers, veterans, and persons interested in pursuing college work for self-improvement regardless of college credit. All courses will be taught by the regular University faculty assisted by specialists in various fields.

Qualified students will be admitted as freshmen if they desire to begin their course in June instead of waiting until the regular academic year opens in September.

The Summer Session is organized into two six-week terms. Students may register for either term or the entire session. Entering freshmen must attend both terms.

LOCATION

The University of Massachusetts is located in Amherst, near the geographical center of the State. This town of 7,000 inhabitants overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted for its scenic beauty and its educational institutions. The University has a winter enrollment of 3800, and its 700-acre campus contains 50 major buildings and a library of 175,000 volumes.

DEGREE CREDIT

All courses offered carry degree credit. They are organized on a one-semester basis, and are equivalent in method, content, and credit to courses offered in the University during the regular academic year. Credits obtained in these courses are ordinarily accepted as transfer credits by other colleges and universities. Students attending the Summer Session may earn not more than six semester hours of credits toward graduate or undergraduate degrees, each term, except in cases where the Dean grants special permission to do more work.

EXPENSES

1. Tuition for residents of Massachusetts (12 weeks)	\$40.00
2. Tuition for non-resident undergraduate students (12 weeks)	\$160.00
3. Tuition for non-resident graduate students per semester credit hour	\$7.50
4. Student Health and Activities fee	\$3.00
5. Room rent at \$4.00 per week	\$48.00
6. Board for 12 weeks (Monday through Friday at \$9.50 per week)	\$114.00

Payment for Summer Session fees is due June 11 and must be paid at or before registration. No student is eligible to attend classes until fees are paid.

ROOMS AND BOARD

Students, not commuting from home, are required to live in University Dormitories and board at the University Dining Halls.

ADVANCE ENROLLMENT; VETERANS AND CIVILIANS

In order to facilitate arrangements, students contemplating attendance should notify the Dean at once using the application form on page 15.

Veterans who plan to enroll under the G.I. Bill must present at the time of registration evidence of eligibility (V. A. certificate of eligibility or, if previously enrolled, a clearance through the University Coordinator). Veterans failing to obtain certification must make payment of tuition and fees.

New students who are not under G.I. Bills must file certificate of residence with the Treasurer's Office.

HEALTH AND RECREATION

The University Infirmary will be kept open during the twelve-week Summer Session with local doctors on call. Such calls will be made only by the nurse on duty and paid for by the University.

Under the guidance of a faculty-student committee, programs for recreation offering many informal sports such as swimming, soft ball, baseball, tennis and hiking will be arranged.

A limited number of special lectures and entertainments will also be provided. Dances and one major picnic will be scheduled by the Social Committee.

CALENDAR

First Term - June 18 to July 28

June 18—9:00 a. m.—12:00 M. Registration, Drill Hall.

1:00 p. m.—3:00 p. m. Registration, Drill Hall.

June 19—8:00 a. m. Classes begin

July 4—Holiday. Classes normally scheduled for this day will be held Saturday, July 7.

July 27, 28—Final exams for First Six-Week Session

July 28—12:00 M. End of First Six-Week Session

Second Term - July 30 to September 8

July 30—8:00 a. m. Classes begin. (Students registering for the second term who did not register for the first term, are urged to register in advance, on Friday, July 27.)

Sept. 7, 8—Final Exams for Second Six-Week Session

Sept. 8—12:00 M. End of Summer Session.

LIST OF COURSES

The following courses will be offered in accordance with the schedule indicated. In general, courses numbered 50 or above are acceptable for graduate credit. The University reserves the right to withdraw any course in which less than eight students are enrolled. Courses marked (1) are given the first six weeks, (2) the second six weeks.

	<i>Credit</i>
(1) ACCOUNTING 25. PRINCIPLES OF BUSINESS ACCOUNTING. The principles underlying the accounting system in the gathering, analysis, and interpretation of accounting data. 2-4:50 MTWTF, North College, 406.	3
(2) ACCOUNTING 26. PRINCIPLES OF BUSINESS ACCOUNTING. The problems of partnership and corporation accounting. 2-4:50 MTWTF, North College, 406.	3
(2) BOTANY 1. INTRODUCTORY BOTANY. The morphology and physiology of plants. 2-2:50 MTWTF, Clark Hall, 104; 3-4:50 MTWT, Clark Hall, 202.	3
(1) BUSINESS LAW 70. The drawing, reading and interpretation of contracts and sales; wills, commercial paper, carriers, real estate agency, public and personal rights. 11:20-12:50 MTWTF, Goessmann, 26.	3
(1) CHEMISTRY 1. GENERAL CHEMISTRY. A study of the fundamental chemical laws and theories. 2-3:30 MWF, Goessmann Auditorium; 2-4:50 TT, Goessmann, 12.	3
(2) CHEMISTRY 2. A continuation of Chemistry 1. 2-3:30 MWF, Goessmann Auditorium; 2-4:50 TT, Goessmann, 12. Prerequisite, Chemistry 1.	3
(1) CHEMISTRY 29. QUALITATIVE ANALYSIS. A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. 1-4:50 MTWTF, Goessmann 28 and 7. Prerequisite, Chemistry 2, General.	4
(2) CHEMISTRY 30. QUANTITATIVE ANALYSIS. The theory and practice of representative determinations, both gravimetric and and volumetric. 1-4:50 MTWTF, Goessmann 28 and 228. Prerequisite, Chemistry 29, Qualitative Analysis.	4
(1) CHEMISTRY 51. ORGANIC CHEMISTRY. Theory of organic chemistry. Deals largely with compounds of aliphatic series. 9:40-11:10 MTWTF, Goessmann, 28; 1-4:50 TT, Goessmann, 112. Prerequisite, Chemistry 29.	4
(2) CHEMISTRY 52. A continuation of Chemistry 51. Deals with the benzene series. 9:40-11:10 MTWTF, Goessmann, 28, 1-4:50 TT, Goessmann, 112. Prerequisite, Chemistry 51.	4

- (2) CHEMISTRY 79. ELEMENTARY BIOCHEMISTRY. Considers the more important facts relating to biological materials and processes. 4
9:40-11:10 MTWTF, Goessmann 26, 1-4:50 TT, Goessmann, 107.
Prerequisite, Organic Chemistry.
- (1) DAIRY INDUSTRY 78. ICE CREAM MAKING. A study of the principles and practices of ice cream making with some time devoted to refrigeration, machinery, delivery equipment, and merchandising methods. 4
8-11:50 MTWTF, Flint Latoratory.
- (1) ECONOMICS 25. ELEMENTS OF ECONOMICS. Definitions and introductory principles of production, exchange, and the financial organization of society; the economics of distribution and the use of wealth and income. 3
11:20-12:50 MTWTF, Goessmann 28.
- (2) ECONOMICS 26. ELEMENTS OF DISTRIBUTION. A continuation of Economics 25 with emphasis on the study of wealth and income distribution. 3
11:20-12:50 MTWTF, Goessmann, 28.
Prerequisite, Economics 25.
- (2) ECONOMICS 73. MODERN ECONOMIC THEORY. A study of current theories about value, distribution, and prices. 3
11:20-12:50 MTWTF, North College, 407.
- (1) ECONOMICS 91. SEMINAR. Economics of War. 3
8-9:30 MTWTF, Goessmann, 26.
- (1) EDUCATION 53. TESTS AND MEASUREMENTS. Construction, administration, scoring and interpretation of results of educational tests. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 32.
- (2) EDUCATION 60. ELEMENTARY SCHOOL CURRICULUM. Content and methodology with emphasis on the unit method and activity program. 3
8-9:30 MTWTF, Liberal Arts Annex, 3.
- (2) EDUCATION 61. ELEMENTARY READING AND LANGUAGE ARTS. Purposes, methods and materials of oral and written language and reading. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 3.
- (1) EDUCATION 62. ELEMENTARY ARITHMETIC AND SCIENCE. Methods and materials. 3
8-9:30 MTWTF, Liberal Arts Annex, 3.
- (1) EDUCATION 63. PRINCIPLES OF ELEMENTARY EDUCATION. Aims, organization, program, and pupil population. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 3.
- (2) EDUCATION 66. AUDIO-VISUAL AIDS IN EDUCATION. A study of a variety of aids and how they may be used effectively in teaching. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 32.

- (1) EDUCATION 72. VOCATIONAL EDUCATION IN AGRICULTURE. A survey of vocational education and an introduction to the teaching of vocational agriculture at the secondary school level. 3
8-9:30 MTWTF, Liberal Arts Annex, 30.
- (1) EDUCATION 75. TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE. Materials, methods, policies, and special State requirements. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 30.
- (1) EDUCATION 108. TEACHER AND SCHOOL ADMINISTRATION. Admission, promotion, personnel, discipline, extra-curricular activities, supervision, tenure, salary schedules. 3
8-9:30 MTWTF, Liberal Arts Annex, 32.
- (2) EDUCATION 167. AUDIO-VISUAL LABORATORY. A second course dealing with operation, care and minor repair of a wide variety of equipment including projectors, recorders, radios, etc. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 30.
- (1) ENGLISH COMPOSITION. Intended to teach straight thinking, sound structure, clear and correct expression. 2
11:20-12:10 MTWTF, Old Chapel, B.
- (2) ENGLISH 2. A continuation of English 1. 2
11:20-12:10 MTWTF, Old Chapel B.
- (1) ENGLISH 25. HUMANE LETTERS. A general reading course based upon a chronological selection of masterpieces, both classical and English. 3
8-9:30 MTWTF, Old Chapel, B.
- (2) ENGLISH 26. A continuation of English 25. 3
8-9:30 MTWTF, Old Chapel, B.
- (1) ENGLISH 65. ENGLISH PROSE OF THE NINETEENTH CENTURY. Among the authors treated are Coleridge, Lamb, Hazlitt, De-Quincey, Carlyle, and Ruskin. 3
8-9:30 MTWTF, Old Chapel, A.
- (2) ENGLISH 67. AMERICAN PROSE. Among the authors studied are Emerson, Thoreau, Hawthorne, Melville, Mark Twain, Henry Adams, and Henry James. 3
11:20-12:50 MTWTF, Old Chapel, A.
- (2) ENGLISH 73. ENGLISH PROSE FICTION. The development of English prose fiction with emphasis upon the great novels of the eighteenth and nineteenth centuries. 3
9:40-11:10 MTWTF, Old Chapel, B.
- (1) ENGLISH 77. THE MODERN NOVEL. An analytical presentation of eleven novels written between 1890 and 1930. 3
11:20-12:50 MTWTF, Old Chapel, A.
- (1) FINANCE 53. MONEY, BANKING, AND CREDIT. A critical survey of the development and operation of the monetary and banking systems of the United States. 3
9:40-11:10 MTWTF, Goessmann, 26.

- (2) **FINANCE 65. CORPORATION FINANCE.** An introductory course in business finance: forms of ownership organization; corporate securities; provision and maintenance of capital. 3
11:20-12:50 MTWTF, Goessmann, 26.
- (1) **FOOD TECHNOLOGY 51. INTRODUCTORY COURSE.** A general elementary course covering food economics, production, distribution and processing. 3
1-5 MWF, Chenoweth Laboratory.
- (2) **FOOD TECHNOLOGY 52. FOOD PRODUCTS AND ADJUNCTS.** Includes pickle, maple, and citrus products; fruit syrups, soups, condiments, and the preservation of meats, poultry, and vegetables. 3
1-5 MWF, Chenoweth Laboratory.
Prerequisite, Food Technology 51.
- (1) **FOOD TECHNOLOGY 61. INDUSTRIAL TECHNOLOGY.** A survey of commercial practices in the manufacture and preservation of food products. 3
1-5 MWF, Chenoweth Laboratory.
Prerequisites, Food Technology 51 and 52; Bacteriology 31, Introductory.
- (2) **FOOD TECHNOLOGY 62.** A continuation of Food Technology 61. 3
1-5 MWF, Chenoweth Laboratory.
Prerequisite, Food Technology 61.
- (1) **FORESTRY 52. FOREST PHOTOGRAMMETRY.** The use of aerial photographs in present-day forest management practice. Map making and forest inventory. Field trips for checking photographic detail on the ground and inspection of photogrammetric equipment. Cost of texts and equipment about \$22. 3
1-3:50 MTWTF, French Hall, 106.
- (1) **FORESTRY 55. ELEMENTS OF FOREST MENSURATION.** Methods of determining the volume and value of the forest growing stock; type mapping as it pertains to timber cruising; methods of predicting growth of trees and stands. 3
8-10:50 MTWTF, French Hall, 106.
- (1) **FRENCH 5. ADVANCED INTERMEDIATE FRENCH.** Readings from representative masterpieces; composition; grammar review. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 8.
Prerequisite, two years of high school French or equivalent.
- (2) **FRENCH 6.** A continuation of French 5. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 8.
Prerequisite, French 5.
- (1) **FRENCH 80. TEACHER TRAINING COURSE.** Practice teaching methods, outside readings in literature. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 8.
- (2) **GEOLOGY 27. PHYSICAL GEOLOGY.** Agents and processes that modify the earth's crust. 3
2-2:50 MTWTF, Fernald Hall, K; 3-4:50 MTWT, Fernald Hall, B.
- (1) **GERMAN 1. ELEMENTARY GERMAN.** Grammar, prose composition, and reading. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 1.

- (2) GERMAN 2. A continuation of German 1.
9:40-11:10 MTWTF, Liberal Arts Annex, 1.
Prerequisite, German 1. 3
- (1) GERMAN 25. INTERMEDIATE GERMAN. German prose and poetry; grammar review and advanced prose composition.
11:20-12:50 MTWTF, Liberal Arts Annex, 1.
Prerequisites, German 1 and 2. 3
- (2) GERMAN 26. A continuation of German 25.
11:20-12:50 MTWTF, Liberal Arts Annex, 1.
Prerequisite, German 25. 3
- (1) GOVERNMENT 25. AMERICAN GOVERNMENT. Structure and operation of our federal government.
11:20-12:50 MTWTF, Old Chapel, D. 3
- (2) GOVERNMENT 28. STATE AND LOCAL GOVERNMENT. The governmental structure and functions of the American state and its local governments.
11:20-12:50 MTWTF, Old Chapel, D. 3
- (1) GOVERNMENT 63. POLITICAL PARTIES AND ELECTIONS. The nature and history of parties, pressure groups, nominations and elections.
8-9:30 MTWTF, Skinner Hall, 17. 3
- (2) GOVERNMENT 65. CONSTITUTIONAL LAW. An historical study of the fundamental rights and guarantees under the American Constitution as interpreted by decisions of the Supreme Court.
8-9:30 MTWTF, Skinner Hall, 17. 3
- (2) HISTORY 6. MODERN EUROPEAN CIVILIZATION. The course covers the period from 1815 to the present.
8-9:30 MTWTF, Old Chapel, C. 3
- (2) HISTORY 54. THE FAR EAST IN MODERN TIMES. The political, cultural, and economic growth of China, Japan, and India.
9:40-11:10 MTWTF, Old Chapel, C. 3
- (2) HISTORY 56. THE HISTORY OF MODERN RUSSIA. The development of Russia from 1800 to the present.
11:20-12:50 MTWTF, Old Chapel, C. 3
- (1) HISTORY 59. HISTORY OF THE UNITED STATES. A survey of the national development of American democracy to 1865.
8-9:30 MTWTF, Old Chapel, C. 3
- (1) HISTORY 70. EUROPE SINCE 1918. Approximately half of the course is devoted to international affairs, the other half to a study of internal developments in the principal European countries.
9:40-11:10 MTWTF, Old Chapel, C. 3
- (1) HISTORY 82. DIPLOMATIC HISTORY OF THE UNITED STATES. The history of the United States as a world power.
11:20-12:50 MTWTF, Old Chapel, C. 3
Prerequisites, History 59 and 60, United States History.

- (1) HOME ECONOMICS 52. NUTRITION AND DIETETICS. The fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins and minerals. 8-9:30 MTWTF, Skinner Hall, 217. 3
Prerequisites, Home Economics 30, Food Science and Preparation; Organic Chemistry or Physiology or equivalent.
- (1) HOME ECONOMICS 77. HOME MANAGEMENT PRACTICE. In the home management house students assume the responsibilities involved in managing a home. 3
Hours by arrangement.
- (1) INDUSTRIAL ADMINISTRATION 11. ECONOMIC GEOGRAPHY. The geographic distribution of natural and human resources; the economic and physiographic bases of agriculture, manufacturing, and allied industries. 3
8-9:30 MTWTF, Goessmann, 28.
- (2) INDUSTRIAL ADMINISTRATION 12. ECONOMIC HISTORY OF THE UNITED STATES. The significant factors in the economic development of the nation. 3
8-9:30 MTWTF, Goessmann, 28.
- (2) INDUSTRIAL ADMINISTRATION 84. PERSONNEL ADMINISTRATION. A study of the principles of the management of labor relations. 3
9:40-11:10 MTWTF, Old Chapel, A.
- (2) MARKETING 53. MARKETING AND MARKETING PROBLEMS. A study of the forces and conditions which determine prices and the mechanism methods, and problems concerned with transporting, storing and distributing economic goods. 3
8-9:30 MTWTF, Goessmann, 26.
- (1) MATHEMATICS 7. ALGEBRA AND TRIGONOMETRY. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry. 3
8-9:30 MTWTF, Mathematics Building, B.
- (2) MATHEMATICS 8. ALGEBRA. Theory of equations, progressions, mensuration, number systems; elements of statistics; mathematics of investments. 3
8-9:30 MTWTF, Mathematics Building, B.
- (2) MATHEMATICS 10. ALGEBRA AND ANALYTIC GEOMETRY. Theory of equations, binomial theorem, determinants of higher order and plane analytic geometry. 3
8-9:30 MTWTF, Mathematics Building, G.
Prerequisite, Mathematics 7.
- (1) MATHEMATICS 29. DIFFERENTIAL CALCULUS. Basic ideas and methods of the differential calculus. 3
9:40-11:10 MTWTF, Mathematics Building, B.
Prerequisite, Mathematics 10.
- (2) MATHEMATICS 30. INTEGRAL CALCULUS. A continuation of Mathematics 29 into the field of integral calculus. 3
9:40-11:10 MTWTF, Mathematics Building, B.
Prerequisite, Mathematics 29.

- (1 & 2) MILITARY 1. FIRST YEAR MILITARY. Extends through twelve weeks. 3
8-9:30 or 9:40-11:10 MTWTF, Liberal Arts Annex, 15.
- (1 & 2) MILITARY 25. SECOND YEAR MILITARY. Extends through twelve weeks. 2
8-9:30 or 9:40-11:10 MTWTF, Liberal Arts Annex, 11.
- (1 & 2) MILITARY 51. THIRD YEAR MILITARY. Extends through twelve weeks. 3
8-9:30 or 9:40-11:10 MTWTF, Liberal Arts Annex, 2.
- (1) MUSIC 51. DISCOVERING MUSIC. An elementary, non-technical course dealing with the elements of music, forms in music, musical compositions, and with selected composers. 3
9:40-11:10 MTWTF, Memorial Hall Auditorium.
- (2) MUSIC 52. GREAT PERIODS OF MUSIC. Periods studied: Renaissance, Baroque, Classic, Romantic, and Modern. 3
9:40-11:10 MTWTF, Memorial Hall Auditorium.
Prerequisite, Music 51.
- (1) PHILOSOPHY 61. INTRODUCTION TO PHILOSOPHY. A general approach to philosophy from the standpoint of method and content. 3
8-9:30 MTWTF, Hasbrouck, 111.
- (2) PHILOSOPHY 62. HISTORY OF PHILOSOPHY. The development of western thought from the early Greeks to the present. 3
8-9:30 MTWTF, Hasbrouck, 111.
- (1) PHILOSOPHY 64. ETHICS. Fundamental ethical theories and practices both historical and contemporary. 3
9:40-11:10 MTWTF, Hasbrouck, 111.
- (2) PHILOSOPHY 81. PHILOSOPHY OF RELIGION. A critical and constructive study of the origin and nature of religion. 3
9:40-11:10 MTWTF, Hasbrouck, 111.
- (1) PHYSICAL EDUCATION 53. PHYSICAL EDUCATION IN ELEMENTARY SCHOOLS. This course is correlated with the requirements of the State Department of Education and includes the objectives, significance, organization, and content of physical education in the grade schools. 3
8-9:30 MTWTF, Physical Education Building, 10.
- (2) PHYSICAL EDUCATION 54. SPECIAL METHODS. This course is correlated with the requirements of the State Department of Education and includes the objectives, significance, organization, and content of physical education in junior and senior high school. 3
8-9:30 MTWTF, Physical Education Building, 10.
- (1) PHYSICS 25. MECHANICS, SOUND, AND HEAT. Equilibrium of bodies; forms of energy and work; motion, fluids, elasticity; wave-motion; thermometry expansion; hydrometry; radiation, etc. Not offered in 1951. 4
11:20-12:50 MTWTF, Hasbrouck, 100; 2-3:50 MWF, Hasbrouck, 108.
Prerequisite, Mathematics 8.

- (2) PHYSICS 26. LIGHT AND ELECTRICITY. Wave-theory of light; optical instruments; polarization; electrostatics; electric currents, etc. Not offered in 1951. 4
11:20-12:50 MTWTF, Hasbrouck, 100; 2-3:50 MWF, Hasbrouck, 108.
Prerequisite, Physics 25.
- (2) PSYCHOLOGY 26. GENERAL PSYCHOLOGY. An introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 27.
- (1) PSYCHOLOGY 81. PSYCHOLOGICAL TESTS. Group tests of intelligence, aptitude, interest, personality, and clinical tests. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 27.
Prerequisite, Psychology 26.
- (2) PSYCHOLOGY 83. ABNORMAL PSYCHOLOGY. A study of the principles relative to the causes, prevention, symptoms, and treatment of behavior abnormalities. 3
8-9:30 MTWTF, Liberal Arts Annex, 27.
- (2) PSYCHOLOGY 86. INDUSTRIAL PSYCHOLOGY. Topics considered include; employee selection and training, motivation and morale, design of machines and equipment, working conditions, fatigue, accident prevention, and advertising and selling. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 27.
Prerequisite, Psychology 26, General.
- (1) PSYCHOLOGY 94. CHILD PSYCHOLOGY. Psychological aspects of the following topics: original nature, maturation, play, social behavior, personality, and mental hygiene. 3
8-9:30 MTWTF, Liberal Arts Annex, 27.
Prerequisite, Psychology 26.
- (1) PUBLIC HEALTH 61. GENERAL AND COMMUNITY SANITATION. A study of problems of rural and municipal sanitation. Cause and control of communicable diseases, official and voluntary health agencies, water supplies, sewerage and sewage, cross connections, swimming pools and shell fish. 3
8-9:30 MTWTF, Marshall Annex, 4.
- (2) PUBLIC HEALTH 62. GENERAL AND COMMUNITY SANITATION. A study of problems of rural and municipal sanitation. Insects and rodent control; sanitation of eating utensils; refuse and garbage disposal; food and milk sanitation; nuisances; housing, camp, and school sanitation. 3
8-9:30 MTWTF, Marshall Annex, 4.
- (1) SOCIOLOGY 28. INTRODUCTION TO SOCIOLOGY. An outline of the social order, and of the individual considered as a member of his various groups. 3
8-9:30 MTWTF, Old Chapel, D.
- (2) SOCIOLOGY 53. AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY. A non-technical sociological study of man in preliterate societies. 3
9:40-11:10 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28, Introductory.

- (1) **SOCIOLOGY 54. AMERICAN RACE RELATIONS.** The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. 3
9:40-11:10 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28, Introductory.
- (2) **SOCIOLOGY 75. SOCIAL PROBLEMS.** A study of abuses affecting the home, recreation, industry, welfare, public health, government. 3
8-9:30 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28.
- (1) **SPANISH 1. ELEMENTARY SPANISH.** Grammar, composition, conversation, reading of selected stories. 3
8-9:30 MTWTF, Liberal Arts Annex, 8.
- (2) **SPANISH 2. ELEMENTARY SPANISH.** A continuation of Spanish 1. 3
8-9:30 MTWTF, Liberal Arts Annex, 8.
Prerequisite, Spanish 1.
- (1) **SPEECH 3 & 4. PUBLIC SPEAKING.** Instruction and opportunity in oral self-expression. 2
12:10-1 MTWTF, Old Chapel Auditorium.
- (1) **SPEECH 91. EXTEMPORE SPEECH.** Theory and practice of public speaking for business and professional purposes. 3
9:40-11:10 MTWTF, Old Chapel Auditorium.
- (1) **ZOOLOGY. 1. INTRODUCTORY ZOOLOGY.** The structure and activities of a representative vertebrate animal, the frog, are considered in detail. 3
2-2:50 MTWTF, Fernald Hall, K; 3-4:50 MTWT, Fernald Hall, F.

SPECIAL COURSES

- CIVIL ENGINEERING 27. PLANE SURVEYING.** The basic principles of mensuration; use of tape, transit, and level; a brief consideration of route surveying. Credit, 3.
3 44-hour weeks: August 27—September 15.
Engineering Building. MR. LAKE, MR. GABRYS.
Prerequisite, Mathematics 5, Introductory Engineering Mathematics, or Mathematics 7, Algebra and Trigonometry.
Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.
- CIVIL ENGINEERING 28. PROPERTY AND TOPOGRAPHIC SURVEYING.** A transit and tape property survey requiring reference to Registry of Deeds records. Credit, 3.
3 44-hour weeks: June 4-23 or June 25-July 14.
Engineering Building. MR. HENDRICKSON, MR. OSGOOD.
Prerequisite, Civil Engineering 25, Surveying, or Civil Engineering 27.
Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

CIVIL ENGINEERING 30. ROUTE SURVEYING PRACTICE. A preliminary survey for a short highway location and the preparation of maps and profile. Credit, 3.

3 44-hour weeks: June 4-23 or June 25-July 14.

Engineering Building.

MR. HENDRICKSON, MR. OSGOOD.

Prerequisite, Civil Engineering 25, Surveying, or Civil Engineering 27.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 23. SHOP. Woodworking, pattern making, and welding; use of various machine and hand tools used in metal working. Credit, 3.

3 44-hour weeks: August 6-25.

Engineering Shop.

MR. LAKE, MR. GABRYS.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 27. SHOP. Woodworking and pattern making; welding. For mechanical engineering majors. Credit, 3.

3 44-hour weeks: June 4-23 or June 25-July 14.

Engineering Shop.

MR. LAKE, MR. PATTERSON.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools: lathe, planer, shaper, milling machine and drill press. Credit, 3.

3 44-hour weeks: June 4-23 or June 25-July 14.

Engineering Shop.

MR. LAKE, MR. PATTERSON.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

PUBLIC HEALTH 91. FIELD TRAINING IN ENVIRONMENTAL SANITATION. Instruction in the various phases of environmental sanitation as a prerequisite for placement in federal, state, or municipal agencies. Enrollment limited to 16 public health majors approved by the department. Credit, 6.

8 44-hour weeks: July 2- August 24.

Marshall Hall.

THE DEPARTMENT.

Tuition fee for Massachusetts residents \$30.00; for non-residents \$120.00.

APPLICATION FOR ADMISSION

Prospective students may use the form below in applying for admission to the 1951 Summer Session. This should be sent to The Dean, University of Massachusetts, Amherst, Mass.

UNIVERSITY OF MASSACHUSETTS

1951 Summer Session

NAME

ADDRESS

COURSES:

*Name and No.**Descriptive Title*

.....

.....

I am a graduate of.....

and received my degree inon.....19

I am a college student at

in the Class of 19.....

Will you be studying under the G.I. Bill?

I will need a room in the dormitory (please check)

I will commute (please check)



*Other University of Massachusetts
Catalogues:*

- Undergraduate Catalogue
- Graduate School Catalogue
- Stockbridge School Catalogue

Bulletin

UNIVERSITY OF
MASSACHUSETTS

COMMENCEMENT

1951





PRESIDENT'S LETTER

TO ALUMNI AND FRIENDS OF THE UNIVERSITY OF MASSACHUSETTS:

This is a cordial invitation to all of you to attend our Eighty-First Commencement.

Commencement is a time to revive old friendships and renew contacts with the University. Changes in physical plant and in organization have come rapidly. They bear witness to the vitality of the University and the essential soundness and adaptability of the program that has been developed through the years. The University must always be ready to move forward with the changing times as it responds to public needs in higher education.

This is still your University. The old and honored landmarks are still here and students find the campus the same friendly place many of you have known so well. We look back with pride on the accomplishments of your college generations; we look forward with keen anticipation to a future marked by a full development of all that is best in the University tradition.

Sincerely,

RALPH A. VAN METER

PROGRAM



FRIDAY, JUNE, 1 1951

8:00 P. M. Informal Class Reunions.

9:00 P. M. Sophomore-Senior Hop.

SATURDAY, JUNE 2, ALUMNI-CLASS DAY

10:00 A. M. Annual Meeting, Associate Alumni, Memorial Hall.

10:30 A. M. Semi-Annual Meeting, Board of Trustees, President's Office.

12:00 M. Alumni Clambake, Drill Hall.

2:00 P. M. Alumni Parade to Ball Game.

2:30 P. M. Varsity Baseball Game with Springfield College, Alumni Field.

Following Game—Half Hour Concert on Chime.

5:00 P. M. Dedication of Hugh P. Baker House, Rhododendron Garden. (In case of rain, Skinner Hall).

6:00 P. M. Fraternity and Class Reunions as arranged by organizations.

7:15 P. M. Senior Class Night Exercises, Goodell Library Lawn. (In case of rain, the Cage).

9:00 P. M. Roister Doister Play, "Lilium".

SUNDAY, JUNE 3, COMMENCEMENT

9:00 A. M. Academics and Varsity Club Breakfast Meetings, Draper Hall.

11:00 A. M. Baccalaureate Service, the Cage.
Speaker: Abram Leon Sachar, Ph.D., President, Brandeis University, Waltham, Massachusetts.

12:00 M. Fraternity and Class Reunions as arranged by organizations.

3:00 P. M. Academic Procession from Memorial Hall.

3:30 P. M. Graduation Exercises.
Address by Charles Woolsey Cole, Ph.D., L.H.D., LL.D.
President of Amherst College

ALUMNI REUNION PROGRAM

SATURDAY, JUNE 2

- 10:00 A.M. – Annual Meeting of the Associate Alumni, Auditorium, Memorial Hall.
12:00 Noon – Annual Alumni Clambake, Drill Hall.
Alternative luncheon, Draper Hall.
2:30 P.M. – Alumni Parade, Memorial Hall to Alumni Field.
3:00 P.M. – Varsity Baseball Game—with Springfield College, Alumni Field. Following the game there will be a half-hour concert on the college chime.
6:00 P.M. – Class and fraternity reunions and suppers as arranged by the various organizations.
9:00 P.M. – Roister Doister Play—"Liliom", Bowker Auditorium.

CLASS REUNIONS

ALUMNI REGISTRATION HEADQUARTERS, MEMORIAL HALL

- 1891 60th Reunion—John B. Hull, Berkshire Block, Great Barrington.
1894 Annual Reunion—Dr. S. Francis Howard, 58 Main St., Northfield, Vt.
1896 55th Reunion—Asa S. Kinney, 74 Woodbridge St., South Hadley.
1901 50th Reunion—Dr. Clarence E. Gordon, 108 Lincoln Ave., Amherst.
1903 Annual Reunion—Gerald D. Jones, Cowles Farm, North Amherst.
1906 45th Reunion—Richard Wellington, New York Agric. Exp. Station, Geneva, N. Y. Edwin F. Gaskill, East Experiment Station.
1911 40th Reunion—Leonard M. Johnson, P. O. Box 583, Danbury, Conn. Frederick A. McLaughlin, West Experiment Station.
1916 35th Reunion—Charles H. Gould, 21 Ardmore Terrace, Collingswood, N. J. Lewis Schlotterbeck, 410 Vernon St., Wakefield.
1920-21 Combined Reunion—Warren M. Dewing, The Landing, Kingston. Charles H. Mallon, 787 Stony Hill Road, Springfield.
1926 25th Reunion—Maude Bosworth Gustafson, 83 Federal St., Brunswick, Me.
1931 20th Reunion—Fred S. Troy, Old Chapel, and a Committee.
1936 15th Reunion—John W. Stewart, Jr., 32 King St., Holyoke.
1941 10th Reunion—Clement F. Burr, East St., Southampton.
1946 5th Reunion—Roger G. Richards, 2 Lyn Drive, South Hadley.
1948 3rd Reunion—Warren P. Gingras, 2539 Kenilworth Rd., Cleveland Heights 6, Ohio.
1950 1st Reunion —Robert Leavitt, 263 Green St., Brockton.

VOL. XLIII

MAY, 1951

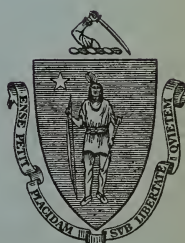
NUMBER 5

PUBLICATION OF THIS DOCUMENT APPROVED BY
GEORGE J. CRONIN, STATE PURCHASING AGENT

Bulletin

UNIVERSITY OF
MASSACHUSETTS

STOCKBRIDGE SCHOOL
OF AGRICULTURE
1952-1954



"No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture. I know nothing so pleasant to the mind as the discovery of anything that is at once new and valuable—nothing that so lightens and sweetens toil as the hopeful pursuit of such discovery. And how vast and how varied a field is agriculture for such discovery. The mind, already trained to thought in the country school or higher school, cannot fail to find there an exhaustless source of enjoyment. Every blade of grass is a study; and to produce two where there was but one is both a profit and a pleasure. And not grass alone; but soils, seeds, and seasons; hedges, ditches and fences; draining, droughts, and irrigation; plowing, hoeing and harrowing; reaping, mowing and threshing; saving crops, pests of crops, diseases of crops, and what will prevent or cure them; implements, utensils, and machines, their relative merits, and to improve them; hogs, horses, and cattle; sheep, goats, and poultry; trees, shrubs, fruits, plants, and flowers; the thousand things of which these are specimens—each a world of study within itself."

— ABRAHAM LINCOLN —

*From address at Wisconsin State Fair,
Milwaukee, Wisconsin, September 30, 1859.*

Note: President Abraham Lincoln signed the bill known as the Morrill Act, sponsored by Senator Justin Morrill of Vermont, in 1862 in the midst of the great Civil War. This law established agricultural colleges in every state of the country under federal aid.

Massachusetts accepted the provisions of this Act in 1863, indicating that "the leading object of the College shall be to teach subjects relating to agriculture and the mechanic arts so as to promote liberal and practical education."

Thus was born our modern system of agricultural education which is contributing so greatly to the health and welfare of this nation and of the world.

Bulletin

UNIVERSITY OF MASSACHUSETTS

Stockbridge School of Agriculture 1952 - 1954



The University of Massachusetts is both a State University and a Land Grant College and as such has been established by Acts of Congress and of the Legislature of Massachusetts.

The two year course in practical agriculture at The University of Massachusetts is known as The Stockbridge School of Agriculture, named after an early president of the University. Included herein are descriptions of the various courses offered, information concerning expenses, enrolment, regulations, etc. In the back of catalogue will be found forms for application and certificate of citizenship.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

UNIVERSITY BULLETIN
Amherst, Massachusetts

VOLUME XLIV

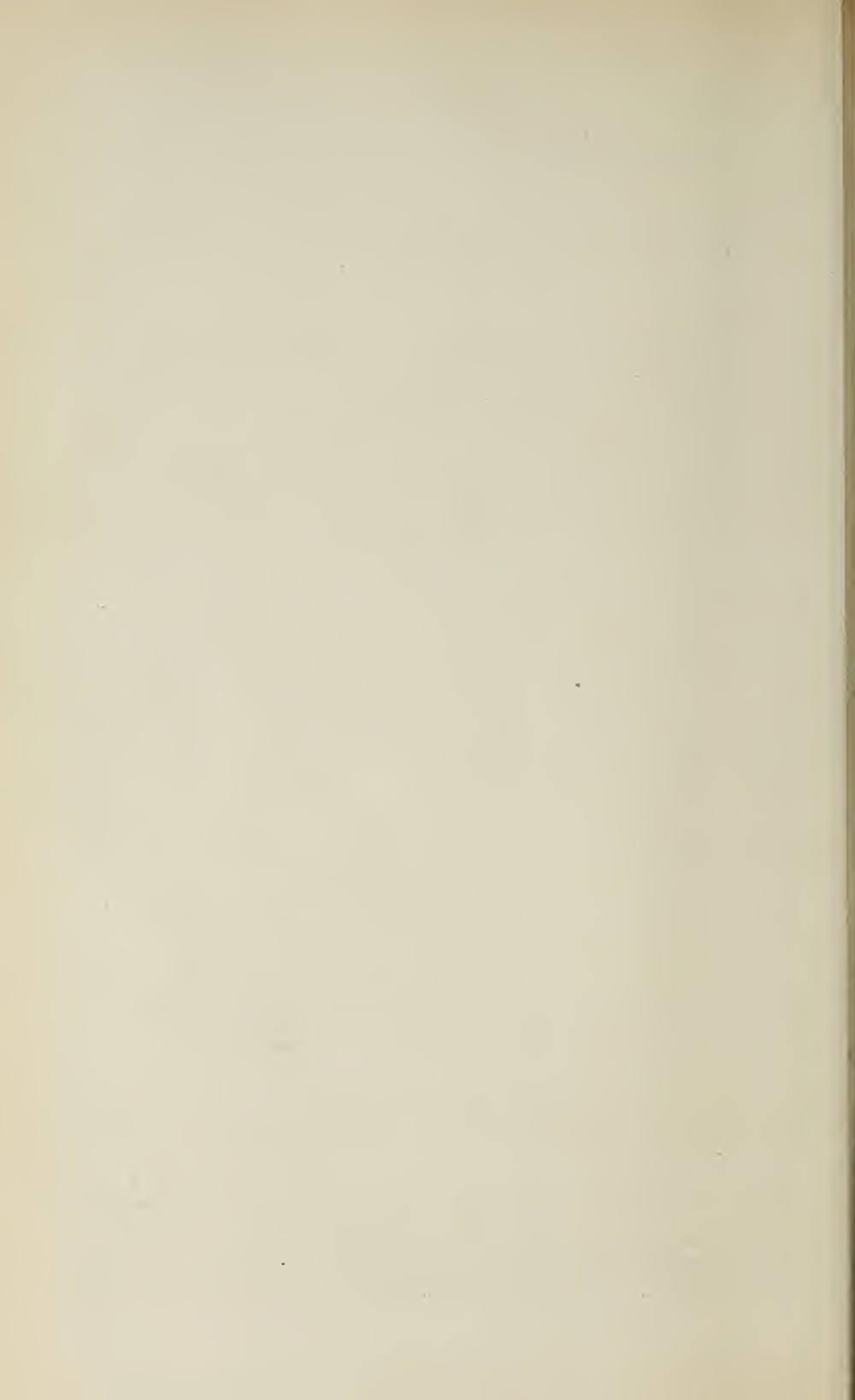
JANUARY, 1952

NUMBER 1

Published five times a year by the University of Massachusetts, January, February, April (two), May.

Application for re-entry as second-class matter applied for at Post Office, Amherst, Mass.

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FOREWORD

Since 1918 the University of Massachusetts has been providing for its citizens a two-year vocational program of courses covering the principal fields of technical and applied agriculture and horticulture. This past year the total enrolment in the Stockbridge School of Agriculture was 438 including 93 veterans.

The Place of Agriculture in Education.—By John Chandler, former Commissioner of Agriculture for Massachusetts. Excerpts.

"I am sure you join with me in marveling at the tremendous strides which have been made in agriculture during the last twenty-five years. When I started farming, thirty-five years ago, we were farming just about the way our fathers and grandfathers had farmed for hundreds of years. We were following methods and practices handed down from father to son, ways which had proved practical by trial and error. To be sure there had been a few advances, the steel plow, the mowing machine, the binder and the ensilage cutter and crude manure spreaders had come into use. Now only a short generation later we look back on those early days and marvel at the advances which have taken place in plant and livestock breeding, in mechanization made possible by the internal combustion engine and electric power, in chemistry as expressed in new fertilizer and spray materials, in the science of bacteriology, in cultures and tillage practices, and in the physical methods of caring for soils, known as soil conservation practices.

I can remember hoisting hay by the forkful on to endless loads and mowing it away by hand in the smothering heat of dusty haylofts; doing all the milking by hand by the light of a lantern; driving the cows out to watering troughs in the yard, winter and summer; cutting ensilage corn with a corn knife and gathering it in armfuls and placing it on wagons to draw to the silo. I can remember cutting ice in the winter and bucking it into the ice house, digging it out every day all summer to float in a tank to keep the milk sweet; the endless fixing of fences; shovelling out manure in the winter on a little sled body and spreading by hand on the snow; driving every day through snow or mud over dirt roads in an express wagon three miles to a railroad station carrying eight-quart cans of milk which went to some milk dealer in a distant city, who paid me what he thought he could get away with—usually 2½ to 3 cents per quart; walking behind a plow, and then,—Oh glorious day, riding a sulky plow—bumping over the stones, and walking all day in the dust behind one kind of a harrow or another. Clearing out stone walls with horses, a drag, crowbars—a very slow and expensive undertaking.

All these things are just back around the corner. It is almost incredible how we have advanced. No longer are we farmers bowed down by never-ending drudgery, and too tired to raise our eyes to the new horizons ahead. Today the farmers of Massachusetts are using their minds and their ingenuity in growing better and larger crops, with less and less labor. I believe we are right at the start of the greatest renaissance our agriculture has ever experienced. Younger men are stepping in to operate our farms, using their brains and imaginations as well as their strong bodies. They are expanding and improving their farms as never before. They are building into their enterprises greater stability with security for themselves and their families. Of all the classifications of industries in our State today—farming is the most up-and-coming—is advancing the fastest, and offers the greatest opportunity for young men endowed with adventurous and pioneer spirit.

The land is the same good land we have always had, but we are learning to improve and expand our acres with the help of modern heavy equipment so that our little old farms, cut up into small fields surrounded by stone walls and bushes, are beginning to blossom with large fields suitable for the use of modern equipment, so that in the next few years, I believe, our countryside, will be dotted with as efficient farms as there are anywhere in the world. Add to this the fact that we operate in the midst of

a dense population, with the finest markets anywhere at our very doors. Is it any wonder that the young men are beginning to see the prospects ahead and that a pioneer spirit is abroad in our countryside? * * *

A hundred, or a thousand years ago for that matter, agriculture was a trade and was not considered a fitting subject for intellectual development. Almost everybody was a farmer back home anyway and was well aware of the relation between food and life. The facts of life were all about them. But since that day the industrial era has changed our civilization as we know it. Now a fortunate few raise all the food for the many. Most everybody is so far removed from the soil, particularly in industrial regions like ours, that they have lost track of one of the great fundamentals of existence. An educated man should understand the Mendelian Law, how plants grow, and what makes a good soil; he should have a comprehension of the effect of soil on civilization, and of the arguments for and against the Malthusian theory.

The purpose of an academic education is not the imparting of information but rather the discipline of the mind together with an acquaintance with some of the eternal truths which are the foundation of our civilization. My contention is that the study of the fundamental axioms of agriculture is as sound a basis for mind training as any of the subjects traditionally found in a liberal arts course—and most necessary in this day and age, lest our so-called educated man lose touch altogether with an important source of our civilization. What the farmer of yesterday, today, and tomorrow needs to know are the underlying principles of agriculture and enough practical skills in the field so that he will be able to use the tools of his calling efficiently. And so I come up with the proposition that an understanding of the fundamental principles of agriculture is an essential part of a liberal education. * * * *

To sum up, then—the type of farmers, together with farming, in Massachusetts is changing rapidly under the stimulus of impelling advancements in science and engineering. No longer should farming be considered a trade, in which skill is the only desirable teaching objective. What appears to be needed *today and tomorrow* is a trained mind and a broad understanding of the fundamentals of agriculture and enough vocational training so that the beginner will have adequate knowledge of farming procedures to make a creditable start. From then on he is on his own. And, finally, that these principles of Agriculture have a place in cultural education."

Courses described in this catalog will be of particular value to young people who have a sound reason for going into an agricultural business, and who fully realize the usual risks and difficulties that are bound to arise. To more fully acquaint them with both the opportunities and the limitations involved, we are including here an excellent statement taken from the booklet "Agricultural Facts About Massachusetts" published by the Massachusetts Development and Industrial Commission. This was prepared by Louis A. Webster, a former Acting Commissioner of Agriculture of Massachusetts, 1942-44, and at present Director of Markets of the Massachusetts Department of Agriculture.

"Living on the Land and off the Land.—Farm living in Massachusetts, as elsewhere, offers an opportunity to live on the land in nature's environment and in a position to subsist to a large degree on crops of one's own production, or literally, "off the land".

Massachusetts also offers an active, though exacting, market for over a hundred million dollars worth of farm products annually. These products are now grown on 30,000 farms, covering 400,000 acres of cultivated land and a total area of 2,000,000 acres.

It should be pointed out at once that farm products, whether they are for home use or are produced by the carload, are not by any means manna from heaven. Successful production is the result of constant expenditure of physical and mental toil and the accumulation of generations of experience.

In spite of the industrialization of our State, the war years saw the greatest production of food in the whole three centuries of our experience. About 1,750,000,000 pounds of food are produced annually from the soil of Massachusetts. This fills 20% of the food needs of our people.

The soil of New England is not as easy to work on the average as in more typically agricultural sections of our country; but that very difficulty of operation has bred a determination to keep intact our heritage. We have probably lost less land by erosion and soil depletion than the nation has as a whole. For generations we have had to feed our soil, so that fertilization is a part of our farm practice and we are prepared to maintain and increase our soil fertility.

Due to our proximity to markets and to the size of our farms, it is naturally unprofitable to raise grain, beef, pork or fibre crops in large volume. It is desirable and necessary for us to specialize in the intensive production of such valuable crops as milk, eggs, fruit, vegetables and flowers. The crops we grow are the so-called "protective foods" that maintain our health and stamina in a vigorous climate and in an active and aggressive social order.

Massachusetts has some of the best purebred dairy herds in the world. We have some of the heaviest producing poultry flocks in existence; and our production of eggs has increased from 20,000,000 dozen in 1930 to 78,500,000 dozen in 1950. The Massachusetts apple crop totals about 3,500,000 bushels which is just enough for our own use. 500,000 barrels of cranberries a year are grown in the Bay State, accounting for 60% of the nation's total. Massachusetts vegetable growers, large and small, produce 17,000,000 bushels of vegetables yearly. Opportunities for expansion will increase when thousands of local growers produce crops for immediate freezing in hundreds of thousands of private freezers.

Thousands of acres of Massachusetts land in the Connecticut Valley, on Cape Cod and in scores of other localities have only been scratched in their possibilities for food production. Massachusetts soil is ready to add stability to the economy of thousands of part-time farmers, and to produce thousands of tons more food for our four and a third million people.

Agricultural effort has been well repaid in Massachusetts, but wealth from the soil is not released without great skill and effort. The soil is a faithful silent partner but demands aggressive and constant cooperation."

CALENDAR

THE STOCKBRIDGE SCHOOL OF AGRICULTURE

1952

January 3, Thursday, 8:00 A.M.	Classes Resume
January 28-30, Monday to Wednesday, 5:00 P.M.	Final Examinations
January 30, Wednesday, 5:00 P.M.	First Semester Ends
February 4, Monday, 8:00 A.M.	Second Semester Begins
February 22, Friday	Holiday, Washington's Birthday
March 1, Saturday, 12:00 M.	Second Semester ends for Poultry Majors
March 3, Monday	Placement begins for Poultry Students
March 29, Saturday, 12:00 M.	Second Semester ends for all courses except Food Management and Forestry
March 31, Monday	Placement begins for all majors except Food Management and Forestry
April 5-14, Saturday, 12:00 M. to Monday, 8:00 A.M.	Spring Recess
April 14, Monday, 8:00 A.M.	Classes Resume
April 19, Saturday	Holiday, Patriot's Day
May 19-22, Monday to Thursday	Final Examinations
May 23-25, Friday to Sunday	Commencement

1952 - 1953

September 29, Monday	Freshman Registration
September 30, Tuesday	Senior Registration
October 1, Wednesday, 8 A.M.	First Semester begins for Freshmen and Seniors
October 1, Wednesday, 11:00 A.M.	Opening Convocation
October 13, Monday	Holiday, Observance of Columbus Day
November 11, Tuesday	Holiday, Armistice Day
November 26-December 1, Wednesday, 12:00 M. to Monday, 8:00 A.M.	Thangsgiving Recess
December 20-January 5, 1953, Saturday, 12:00 M. to Monday, 8:00 A.M.	Christmas Recess
January 5, Monday, 8:00 A.M.	Classes Resume
January 31, Saturday, 12:00 M.	Classes Stop
February 2-4, Monday to Wednesday, 5:00 P.M.	Final Examinations
February 4, Wednesday, 5:00 P.M.	First Semester Ends
February 9, Monday, 8:00 A.M.	Second Semester Begins
February 23, Monday	Holiday, Observance of Washington's Birthday
March 7, Saturday, 12:00 M.	Second Semester ends for Poultry Majors
March 9, Monday	Placement begins for Poultry Students
March 28-April 6, Saturday, 12:00 M. to Monday, 8:00 A.M.	Spring Recess
March 28, Saturday, 12: M.	Second Semester ends for all courses except Food Management and Forestry
March, 30, Monday	Placement begins for all majors except Food Management and Forestry
April 6, Monday, 8:00 A.M.	Classes Resume
April 20, Monday	Holiday, Observance of Patriot's Day
May 23, Saturday, 12:00 M.	Classes Stop
May 25-28, Monday to Thursday	Final Examinations
May 29-31, Friday to Sunday	Commencement

THE TRUSTEES

Organization of 1951

MEMBERS OF THE BOARD

	TERM EXPIRES
MRS. JOSEPH SWAN LEACH of Walpole	1952
RALPH FRED TABER of West Newton	1952
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HARRY DUNLAP BROWN of Billerica	1954
JOHN WILLIAM HAIGIS of Greenfield	1954
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PHILIP FERRY WHITMORE of Sunderland	1955
WILLIAM MICHAEL CASHIN of Milton	1956
WILLIAM AYLOTT ORTON of Northampton	1956
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S t a f f

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Dean of the University

ROBERT D. HAWLEY, M.B.A.

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Assistant Professor LUTHER BANTA, Sec'y

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Assistant Professor OTTO G. KRANZ

Assistant Professor HARRY G. LINDQUIST

Assistant Professor ROBERT C. PERRIELLO

Assistant Professor CHARLES H. THAYER

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Associate Professor of Music

JAMES F. ANDERSON, M.S. French Hall
Instructor in Pomology

OSCAR G. ANDERSON, B.S. French Hall
Assistant Professor of Pomology

WALTER M. BANFIELD, Ph.D. Clark Hall
Assistant Professor of Botany

LUTHER BANTA, B.S. Stockbridge Hall
Assistant Professor of Poultry Husbandry

ROLLIN H. BARRETT, M.S. Stockbridge Hall
Professor of Farm Management

LYLE L. BLUNDELL, B.S. Wilder Hall
Professor of Horticulture

KENNETH L. BULLIS, D.V.M. Paige Laboratory
Professor of Veterinary Science and Head of Department

JAMES W. CALLAHAN, B.S. Stockbridge Hall
Instructor in Agricultural Economics

WILLIAM G. COLBY, Ph.D. Stockbridge Hall
Professor of Agronomy and Head of Department

ALTON B. COLE, M.F. Conservation Building
Instructor in Forestry

MRS. GLADYS M. COOK, M.S. Edna Skinner Hall
Assistant Professor of Home Economics

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Placement Officer for Women

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Assistant Professor of Animal Husbandry

HELEN CURTIS, A.M. South College
Dean of Women

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Instructor in Home Economics

DOROTHY DAVIS, M.A. Edna Skinner Hall
Instructor in Home Economics

LLEWELLYN L. DERBY, M.S. Physical Education Building
Assistant Professor of Physical Education

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Associate Professor of Agrostology

CHARLES W. DUNHAM, B.S. French Hall
Instructor in Floriculture

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EUGENE J. FINNEGAN, B.S. <i>Instructor in Dairy Industry</i>	Flint Laboratory
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ARTHUR P. FRENCH, M.S. <i>Professor of Pomology and Plant Breeding; Head of the Department of Pomology</i>	French Hall
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DENZEL J. HANKINSON, Ph.D. <i>Professor of Dairy Industry and Head of Department</i>	Flint Laboratory
JOHN F. HANSON, Ph.D. <i>Assistant Professor of Entomology</i>	Fernald Hall
ROBERT P. HOLDSWORTH, M.S. <i>Professor of Forestry and Head of Department</i>	Conservation Building
S. CHURCH HUBBARD <i>Assistant Professor of Floriculture</i>	French Hall
FRED P. JEFFREY, M.S. <i>Professor of Poultry Husbandry and Head of Department</i>	Stockbridge Hall
WALTER O. JOHNSON, B.S. <i>Manager of Dining Hall</i>	Draper Hall
WILLIAM B. JOHNSON, B.S. <i>Instructor in Olericulture</i>	French Hall
GORDON S. KING, B.S. <i>Assistant Professor of Arboriculture</i>	Wilder Hall
STEPHEN R. KOSAKOWSKI <i>Instructor in Physical Education</i>	Physical Education Building
THEODORE T. KOZLOWSKI, Ph.D. <i>Professor of Botany and Head of Department</i>	Clark Hall
OTTO G. KRANZ, B.S. <i>Assistant Professor of Food Technology</i>	Draper Hall
EDWARD P. LARKIN, B.S. <i>Instructor in Bacteriology</i>	Marshall Hall
ARTHUR S. LEVINE, Ph.D. <i>Associate Professor of Food Technology</i>	Food Technology Laboratory
HARRY G. LINDQUIST, M.S. <i>Assistant Professor of Dairy Industry</i>	Flint Laboratory
ADRIAN H. LINDSEY, Ph.D. <i>Professor of Agricultural Economics and Head of Department of Agricultural Economics and Farm Management</i>	Stockbridge Hall
WILLIAM P. MACCONNELL, M.F. <i>Instructor in Forestry</i>	Conservation Building
MINER J. MARKUSON, B.S. <i>Associate Professor of Engineering</i>	Stockbridge Hall
HELEN S. MITCHELL, Ph.D. <i>Dean of School of Home Economics</i>	Edna Skinner Hall
EDWARD A. NEBESKY, Ph.D. <i>Instructor in Food Technology</i>	Food Technology Laboratory
D. HORACE NELSON, Ph.D. <i>Assistant Professor of Dairy Industry</i>	Flint Laboratory
ARTHUR E. NIEDECK, M.A. <i>Associate Professor of Speech</i>	Chapel
JOHN L. PARSONS, M.S. <i>Instructor in Agronomy</i>	Stockbridge Hall
ROBERT K. PATTERSON, B.S. <i>Instructor in Agricultural Engineering</i>	Engineering Annex
ROBERT C. PERRIELLO, B.S. <i>Assistant Professor of Bacteriology</i>	Marshall Hall Annex
IRVING J. PFLUG, B.S. <i>Assistant Professor of Agricultural Engineering</i>	Stockbridge Hall
PAUL N. PROCOPIO, B.S. <i>Instructor in Horticulture</i>	Wilder Hall
GEORGE F. PUSHÉE <i>Assistant Professor of Engineering</i>	Stockbridge Hall
ERNEST J. RADCLIFFE, M.D. <i>Professor of Hygiene and Head of Department of Student Health</i>	Physical Education Building

ARNOLD D. RHODES, M.F. <i>Professor of Forestry</i>	Conservation Building
VICTOR A. RICE, M.Agt. <i>Professor of Animal Husbandry; Head of Department.</i>	Stockbridge Hall
J. HARRY RICH, M.F. <i>Associate Professor of Forestry</i>	Conservation Building
OLIVER C. ROBERTS, M.S. <i>Associate Professor of Pomology</i>	French Hall
JOSEPH R. ROGERS, JR. <i>Assistant Professor of Physical Education</i>	Physical Education Building
DONALD E. ROSS, B.S. <i>Assistant Professor of Floriculture</i>	French Hall
WILLIAM C. SANCTUARY, M.S. <i>Professor of Poultry Husbandry</i>	Stockbridge Hall
FRANK R. SHAW, Ph.D. <i>Assistant Professor of Entomology and Beekeeping</i>	Fernald Hall
RUSSELL E. SMITH, V.M.D. <i>Associate Professor of Veterinary Science</i>	Paige Laboratory
GRANT B. SNYDER, M.S. <i>Professor of Commercial Vegetable Growing and Head of Department</i>	French Hall
HERBERT N. STAPLETON, M.S. <i>Professor of Agricultural Engineering and Head of Department</i>	Stockbridge Hall
WALTER J. S. STELKOVIS, A.B. <i>Instructor in Speech</i>	Chapel
PAUL W. STICKEL, M.F. <i>Assistant Professor of Forestry</i>	Conservation Building
HARVEY L. SWEETMAN, Ph.D. <i>Professor of Entomology</i>	Fernald Hall
WILLIAM H. TAGUE, B.S. <i>Assistant Professor of Engineering</i>	Stockbridge Hall
CHARLES H. THAYER, B.Agt. <i>Assistant Professor of Agronomy</i>	Stockbridge Hall
CLARK L. THAYER, B.S. <i>Professor of Floriculture; Head of Department.</i>	French Hall
RUTH J. TOTMAN, M.Ed. <i>Associate Professor and Director of Physical Education for Women</i>	Drill Hall
REUBEN E. TRIPPENSEE, Ph.D. <i>Professor of Wildlife Management</i>	Conservation Building
ALDEN P. TUTTLE, M.S. <i>Assistant Professor of Commercial Vegetable Growing</i>	French Hall
JOHN H. VONDELL <i>Assistant Professor of Poultry Husbandry</i>	Stockbridge Hall
JOHN A. WEIDHAAS, JR., B.S. <i>Instructor in Entomology</i>	Fernald Hall
MRS. MARTHA R. WRIGHT, B.S. <i>Instructor in English</i>	Chapel
ANTHONY W. ZAITZ, M.A. <i>Instructor in Speech</i>	Chapel
JOHN M. ZAK, M.S. <i>Instructor in Agronomy</i>	Stockbridge Hall



MEMORIAL HALL

*Erected in memory of the "Loyal Sons of Old Massachusetts"
who died in World War I.*

*"We Will Keep Faith With You Who Lie Asleep."
(inscription on east facade)*

THE STOCKBRIDGE SCHOOL OF AGRICULTURE

The Stockbridge School of Agriculture is the vocational non-degree department of the University providing training of post high school grade in agriculture, horticulture, and related business activities.

Eleven programs of study are offered, one of which must be selected by each student and completed as specified for the school diploma. The present list of offerings includes:

- | | |
|---|---------------|
| 1. Animal Husbandry | (see page 24) |
| 2. Dairy Industry | (see page 27) |
| 3. Poultry Husbandry | (see page 31) |
| 4. Arboriculture | (see page 35) |
| 5. Commercial Vegetable Growing | (see page 38) |
| 6. Floriculture | (see page 41) |
| 7. Food Management | (see page 45) |
| 8. Forestry | (see page 51) |
| 9. Fruit Growing | (see page 55) |
| 10. Ornamental Horticulture | (see page 59) |
| 11. Turf Maintenance | (see page 62) |

Since its organization in 1918 at the request of the Massachusetts Legislature the school has registered more than 3,000 students and graduated twenty-nine classes. The value of this kind of concentrated, technical schooling aiming directly toward preparation for a definite field of work, is amply demonstrated by the successful careers of our graduates.

It is estimated about fifteen hundred farms change ownership each year in Massachusetts due to death, infirmity of age, disabling accident, or, in some few cases, just plain inefficient management. Farms will always need to have reliable sources of skilled workers and owner replacements, as war food shortages have so clearly proved, if New England crop production is to be successfully maintained on an adequate scale. This is both a challenge and an opportunity to young men and women.

General Information

Entrance Conditions:—The school program is open to any student who is seventeen years old or over and who has completed a secondary school course or its equivalent, but some major courses do require personal interviews with applicants to insure proper qualifications. All eleven programs of study have limited enrolment quotas which cannot be exceeded because placement, employment, or teaching facilities will not permit a larger student registration. There are no formal entrance examinations.

The Stockbridge School of Agriculture is not intended to divert students at present enrolled in high schools. Such students should complete the high school course if possible, since standard of class work required is practically equivalent to junior college grade.

How to Enroll.—Fill out application blank, Form 1, page 74, giving all information requested. Be sure to indicate course you wish to elect. Mail this form, with citizenship certificate, Form II, on same page, to Director of Short Courses. If application is accepted you will be notified, and certificate of citizenship will be kept on file until you register.

Registration.—Registration for freshmen will be held on Monday, October 1 and for seniors on Tuesday, October 2.

Instruction.—Instruction is given by the University teaching staff through classroom teaching, laboratory exercises and practical work. The work of the classroom is supplemented by demonstration work in the barns, dairy plant, greenhouses, orchards, university gardens, engineering shops, quick freezing plant, canning plant, university forest, sawmill, and abattoir. The courses are planned to offer fundamental information, and to establish the underlying reasons as well as the special methods employed in the various operations. The combined advantages of university instruction and a university plant with all its varied resources are thus

made available to young men and women training for successful business careers in agricultural vocations.

The usual University holidays are indicated on calendar, Page 6. First year Arboriculture students report two weeks prior to the opening of regular class work for preliminary training in the use of ropes and climbing. Freshman Poultry students complete only one month of the second semester because earlier placement is required by poultry farmers. Other freshman classes continue to April first, when most students are assigned to placement jobs, excepting Food Management and Forestry freshmen who complete two full semesters. Class work is required at the University in the months of October to March inclusive; placement training for practical experience on jobs away from the University, on a wage basis, is required of all first year students from April to September inclusive, with exceptions noted.

Diploma Requirements.—In order to obtain a diploma a student must complete satisfactorily the entire program of study in which he has registered. A student who fails to pass the requirements of his summer placement training, after a suitable job has been assigned him, is not eligible for graduation until this deficiency is made up, and may not be allowed to enrol for the second year, if the Director of Placement Service considers his record to be unsatisfactory.

Transfer Credits.—Graduation from the Stockbridge School of Agriculture does not fulfill the requirements for entrance in the University degree course, nor are credits earned during the course transferable regularly toward credit for a degree at this University.

Students who make excellent scholastic and placement records in this two-year course, and whose high school preparation has been satisfactory, may transfer to the same major program in the University with credit allowances of one to two semesters, depending on the individual record. This arrangement is limited strictly to students who meet the stipulated requirements, and each case is considered individually by the Registrar.

Graduation Requirements.—No student will be graduated unless all bills due the University are paid on or before the Wednesday preceding graduation exercises.

Diplomas and letters of honorable dismissal will be withheld from all students who have not paid bills due the University, or legitimate bills due private individuals or business concerns.

A diploma will not be awarded to any senior, if arrears are reported by his fraternity. All bills for second semester, senior year, must be settled not later than the Wednesday before graduation.

Attendance at graduation exercises is required of all seniors before diploma will be awarded.

Seniors who have borrowed from the Goldthwait Loan Fund will have diplomas held as collateral by the University until they have paid up loans in full. This in no way interferes with the privileges of graduation.

Scholarship Regulations.—At the close of each semester students receive a formal report showing the standings given in the subjects pursued by them.

If a student's class average in any subject is below 50, he is failed (F) in the course without final examination privilege and must repeat course with the following class.

If the average of the class grade and the final examination is between 50 and 60, the student is thereby conditioned (#) and must repeat examination only for a pass grade.

Students will be graded by instructors at mid-semester to show general standing and at the end of semester for permanent record. The Faculty Committee will consider all questionable grades after each marking period, and instructors will note on grade reports the names of all students whose work is seriously deficient.

When a student's record indicates failures or uniformly poor work, the Faculty Committee may recommend a close supervision of his work by the faculty adviser in his major course, or, if his scholastic grades disqualify him from further work in the school, he may be asked to withdraw at any time.

A first year student who has deficient scholastic work at the end of the first semester in February in his major courses will not be eligible for placement training until his work meets the required standard.

At the end of any semester a student who is failed or conditioned in more than one course or has conditions in more than two courses may be dismissed.

RULES AND REGULATIONS

Absences from Class

- (1) No unexcused absences will be allowed from classes.
- (2) All excuses for absence shall be presented by the student in writing, and, if approved by the Director, an excuse card will be granted to be signed by the instructor. Excuse cards must be returned promptly to the office when properly signed.
- (3) No excuses will be accepted at the Short Course Office unless presented within two days after the student returns to classes.
- (4) Two tardinesses unexcused shall count as one absence.
- (5) Students presenting excuse cards covering absences are expected to make up all work missed, to the satisfaction of the instructor.
- (6) Instructors are directed to reduce final grades five points for each unexcused absence occurring on a student's record at the end of any semester.
- (7) Absences from classes immediately before or after a holiday are not allowed except by special permission.
- (8) The Short Course Office requires all students to report at once any illness to the University physician, particularly if continued absence from class is likely to result from the illness.
- (9) No illness excuse can be accepted unless accompanied by statement from University health staff, local doctor, or from family.
- (10) Students failing to observe these rules are placed on probation, and may be dismissed from the School if further violations occur.

Absences from Examinations or Tests

Any student who absents himself from an appointed examination without sufficient cause shall be given zero thereon. In such case he shall not be entitled to a make-up examination unless the Director so requests.

Student Expenses

Tuition.—A tuition fee of \$50 per semester is charged students, residents of Massachusetts, enrolled in the Stockbridge School of Agriculture. Students who are not residents of Massachusetts are charged a tuition of \$200 each semester. The tuition per semester, charged persons not citizens of the United States is \$200. Students entering from Massachusetts, unless of voting age themselves, are required to file a statement signed by either town or city clerk, stating that the applicant's parent is a legal resident of Massachusetts. (See Form II in back of catalog.)

Variation in Charges for Three Major Courses

Food Management Course.—Placement jobs in the Food Management Course are not available until after June 1, and students have to complete two semesters of resident study each year.

Poultry Husbandry Course.—Because of earlier placement required on poultry farms, students complete only one and one-quarter semesters of class work here the first year.

Forestry Course.—Two full semesters work the first year followed by four months placement training.

Summary of Expenses Estimated:

	FIRST YEAR		FIRST YEAR (Hotel & For- estry Majors)	SECOND YEAR	FIRST AND SECOND YEARS
	First Semester	Second Semester	Second Semester		Field Trips
Tuition (Citizens of Mass.)	\$50.00	\$25.00	\$50.00	\$100.00	\$15.00-52.00
(Poultry Majors)		12.50)			
Board (University Cafeteria) . .	168.00	84.00	168.00	336.00	(Fees listed
(Poultry Majors)		42.00)			under Major
Room Rent (Private Homes) . .	72.00	36.00	72.00	144.00	Programs)
(Poultry Majors)		18.00)			
*Student Fees (Itemized below)	16.75	11.50	17.00	36.00	
Books, stationery, etc.	35.00	35.00	35.00	70.00	
	<u>\$341.75</u>	<u>\$193.50</u>	<u>\$342.00</u>	<u>\$686.00</u>	<u>\$15.00-52.00</u>
		117.00			

Poultry Majors
These figures for board and room are estimates based on prevailing prices and are subject to change when, and if conditions change.

***Student Fees:**

	FIRST YEAR (Hotel & Forestry Majors)					
	FIRST YEAR		SECOND YEAR		THIRD YEAR	
	First Semester	Second Semester	First Semester	Second Semester	First Semester	Second Semester
Athletics	\$10.00	\$5.00	\$10.00	\$10.00	\$10.00	\$10.00
Class Tax	1.00	1.00	1.00	1.00	1.00	1.00
Collegian	1.00	.50	1.00	1.00	1.00	1.00
Concert Fee	1.50	1.50	1.50	1.50	1.50	1.50
Shorthorn (School Yearbook)	2.00	3.00	2.00	3.00	3.00	5.00
Stockbridge School Activities	.50	.50	.50	.50	.50	.50
Student Handbook	.75	—	.75	—	.75	—
	<u>\$16.75</u>	<u>\$11.50</u>	<u>\$16.75</u>	<u>\$17.00</u>	<u>\$17.75</u>	<u>\$19.00</u>

Advance Payment

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Director that they are accepted for admission. This will be considered as first payment on registration fees which will be due at time of matriculation in October. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

Refund of Student Payments

Prepaid tuition and fees will be refunded to students withdrawing as follows:

- Within the first two weeks from the date of registration 80 %
 - Within the third week 60 %
 - Within the fourth week 40 %
 - Within the fifth week 20 %
 - After fifth week, no refund.
- Prepaid board—pro rata refund.
Prepaid room rent—no refund.

When Payments Are Due

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board and room rent in University dormitories are due at the beginning of each semester and must be paid on or before the opening date of each semester. Bills will be rendered in advance by the University Treasurer and payment may best be made by mail. Students may not attend classes until registration charges are paid.

Late Registration

Any student who does not complete his registration, including payment of semester charges on the regular registration days will be required to pay a fine of five dollars.

Rooms

Men Students: Dormitory rooms are available only to students of the four year course. Private homes in the town furnish the chief source of rooms for Stockbridge students under assignment by the University Housing Office. Students are notified prior to registration of their location and should not make earlier inquiry.

Women Students: Women students of the Stockbridge School are housed in University dormitories and have their meals at the University Dining Hall, unless given permission to commute from home. Room rent is approximately \$124 for Freshmen, \$165 for Seniors. Board is approximately \$225 for Freshmen, \$340 for Seniors for a five-day week.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time House-mother, so that conditions in the residence hall are conducive to study and good living habits. Through Women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Room furnishings include mattress and pillow; students furnish bedding, linen, towels, desk lamp and wastebasket. Rooms are cared for by students occupying them.

Dormitories are open at 1:00 o'clock on Sunday preceding Stockbridge registration.

Board

Stockbridge freshmen are not required to secure meals in the University cafeteria, but can do so if it is more convenient.

A number of public restaurants or dining rooms are located close to the University where most students arrange for meal service, usually approximating \$2.00 a day, with allowances made if student goes home on weekends, class schedule permitting.

A new student should sample the various places to find one suited to his needs, where he can meet with congenial members of his class group.

Books and Supplies

For the convenience of students, the University maintains a store service in North College. Here all textbooks may be purchased at cost plus transportation charges. Students are informed at the first class session in each course what books are required and must secure individual copies according to order list sent in by instructor.

There is little opportunity to secure secondhand books because most students find the texts assigned of value to retain as reference sources after completing a course.

Student Aid

Students desiring any form of financial aid from the University including scholarship, employment, or loan, are required to file applications with the Student Aid Committee not later than June 10 of each year. Incoming freshmen are allowed an extension of time.

These application forms are used to determine the comparative need of the applicants and are passed on by the Student Aid Committee. No student is eligible for any kind of financial assistance from the University unless he or she has filed the required form and has been certified as deserving by the Student Aid Committee. Application forms may be secured at the Placement Service Office, South College.

The placement training period between the first and second year usually enables a student to earn from \$500 to \$1,000 depending upon his skill and general ability, and the type of work. This will pay a large part of the second year expenses.

Prospective students should understand that the above estimates cover expenses which may be called strictly University expenses, and that there are other financial obligations voluntarily assumed by students which they should expect to meet. Such expenses vary from \$28 to \$36 a year. Additional financial responsibility is also assumed by students joining fraternities or entering into other social activities of the University. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$600 to \$700 for the first year for one and one-half semesters in residence, and \$800 to \$900 for the second year of two semesters.

Student Employment Projects

Part-time work is available for a limited number of needy students. The type of work to which students may be assigned is as follows: clerical and office, building and grounds maintenance, farm, greenhouse and orchard duties, helpers in livestock and cattle barns, and other miscellaneous jobs.

Self Help.—The University does not encourage students to enter without money in the expectation of earning their way entirely. The student will find it better to work and accumulate sufficient funds before coming to the University, or else to take more than two years in completing his course.

No student should undertake work that interferes with his studies, and students should understand that no one may receive any large amount of work at the University.

First year students particularly should not risk failure in their beginning studies by taking on such extra work until they have, at least, tested themselves in the study program of the first semester. It is advised to proceed cautiously in combining both extra work and athletics at the same time, if the student's scholastic record is at all questionable.

The Vincent Goldthwait Loan Fund.—This fund was established by Dr. Joel E. Goldthwait, U. of M. 1885, of Boston, as a memorial to his son who died in 1922 during his junior year at Harvard. Its purpose is to aid worthy senior students who find it difficult to secure adequate finances to complete their final year. Only seniors needing a supplement to funds already available will be considered. Amounts in excess of \$200.00 are rarely granted and most loans range from \$50 to \$150.00.

A regular promissory note must be executed, endorsed by parent or guardian, and repayment may be made within any reasonable period after graduation up to one year. There is no interest charge.

Wilbur H. H. Ward Scholarships.—The Wilbur H. H. Ward Fund is administered by a Board of Trustees independent of the University. Applicants for these scholarships should write to Sumner R. Parker, who may be addressed at the University. They are available only to Hampshire County boys.

Ascension Farm School Corporation Scholarships.—This Corporation, while no longer operating a special farm school, continues its specific service by providing "care, education and training in agriculture of boys resident in Western Massachusetts," as stated in its charter. Aid is available chiefly to residents of Berkshire County.

Application form should be secured from the Director of Short Courses after notice of admission to the Stockbridge School of Agriculture has been received. Scholarships are granted only after final approval by the Board of Trustees and officers of the Corporation.

General Exercises

Assembly exercises are held weekly on Wednesdays, 11:00-12:00 M., and serve to bring together all Stockbridge students for a general program dealing with matters of interest to the University and the School. Among speakers who appear from time to time are the President of the University, members of the University Staff and others who have interesting subject matter to present. This weekly assembly also enables announcements concerning students and student affairs to be presented, and permits class presidents to make advance reservations for business meetings when necessary. **No unexcused absences from this exercise are allowed.**

STUDENT ACTIVITIES

A large number of student organizations furnish opportunity to students for work and leadership.

Memorial Hall is the center of student activities and contains offices for the various student organizations, including the Stockbridge School Student Council. On the first floor are located a lounging room, the Memorial Room, and the offices; in the basement, bowling alleys, pool and ping pong tables; and on the second floor an auditorium for meetings and dances. This building was erected by the alumni, students, faculty, and friends in honor of the fifty-one "Aggie" men who gave their lives in World War I.

For those students who play musical instruments there are opportunities with the University Orchestra and the University Band.

Student Council.—The Stockbridge School Council is composed of representatives of the first and second year classes. This body serves as a general committee on student government and helps to maintain the best traditions and customs of the school.

Shorthorn.—A student yearbook called "The Shorthorn" is published annually by the members of the graduating class, and is usually issued in June. All students subscribe to it.

Fraternities.—There are two Stockbridge fraternities for men in the student body. Alpha Tau Gamma and Kappa Kappa, both owning houses, serving as social and residential centers for their groups.

Scholastic Society

A Stockbridge Honorary Scholastic Society called "Stosag" was established in 1935 to encourage high scholarship. Students whose records show no grade below 70 in any subject and whose average for the first three semesters is 85 or better, are elected to membership in the society each June. Engraved certificates are awarded to members of the graduating class who have achieved this distinction.

Athletics and Physical Education.—The School has its own separate athletic program with regular schedules in football, basketball, ice hockey, cross-country and winter track. Sweaters and insignia are awarded to team members and managers in these sports. The official insignia is the letter S.

The football team plays a schedule of 6-7 games with preparatory school teams. The basketball team plays a 12 game schedule; the cross-country team usually runs 3 races, while 2 or 3 meets are scheduled for the winter track squad. Ice hockey affords 6 to 8 games depending on the weather.

Due to the fact that freshmen are on placement training during the spring term which leaves only seniors available, no regular team is maintained in baseball. Men desiring to play are organized into teams and an intramural league is arranged.

This athletic program is entirely under the supervision and direction of the Athletic Department of the University and coaches are provided for all sports. Instructor Stephen R. Kosakowski, director of the Stockbridge physical education work, is coach of football, basketball, hockey, and has charge of the spring recreation program. Assistant Professor Llewellyn L. Derby, coach of the varsity track team, has charge of the cross-country.

All students are urged to participate in some sport each semester, but first year students should be sure all studies are well maintained. No squads are reduced by eliminating the inexperienced players, and everyone is given an opportunity to play in games. The football squads in the past have consisted of approximately 50 candidates. Games have been scheduled for both the second and third teams so that every man on the squad has participated in an outside scheduled game. Both the first and second teams in basketball have regularly scheduled games and an intramural league schedule is arranged for those not playing on the first squad.

Every care is exercised to guard against men overtaxing their strength in any sport or game to the detriment of their health. No man whose physical condition is at all questionable is allowed to play on the teams. A careful check is maintained by required physical examinations for all students given by the University physician at the opening of the school year. A second examination is made of each man before permission is granted to participate in any sport.

Students also subscribe to the university varsity games and have attendance privileges for varsity sports on the campus.

Class work in physical education for men not on athletic squads is required for both seniors and freshmen during the first semester. This consists of 2 class periods a week. The object of the course is to give the men some knowledge of games which may be of value to them in after school days, as well as to give every man an opportunity to develop sufficient control over his body to enable him to get pleasure from physical activities and to establish correct health habits.

The freshmen receive instruction in softball, touch football, and swimming. Men may elect football or cross-country, instead of the regular class work. The seniors take up volleyball, badminton, and swimming. They may also elect football or cross-country. The classes are organized into teams which compete against each other with much rivalry. Students are expected to wear old clothes during the play period, and shower baths are required at the close of each class period.

A physical education building containing a swimming pool, a great indoor cage 150 by 180 feet for all kinds of sports and games, and complete locker room and shower bath facilities provide ample equipment to carry out this program. Individual equipment is supplied to all members of the football, hockey, basketball, cross-country, and track squads.

STUDENT RELATIONS

The customary high standard of university men in honor, manliness, self-respect, and consideration for the rights of other constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or persistent violation of rules must be reported by the instructor to the Director for discipline.

The privileges of the university may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the university, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined, but he may be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the university authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by your local doctor is required of all entering freshmen and re-entering students. Physical report forms for this examination will be mailed to each student prior to October 1, and must be returned to the Short Course Office not later than that date.
- (2) The Student Health physicians have offices in the Physical Education Building and in the out-patient Infirmary Building, where they may be consulted during college hours.
- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by one of the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.
- (5) House calls cannot be made to dormitories, private homes, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.
- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient:
 - (a) *Nurses.* — If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service.* — If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.
 - (c) *Supplies.* — Special medical supplies prescribed by a physician will be charged to the patient.

- (d) *Laundry*. — Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accidents and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expenses and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

GOODELL LIBRARY

This fine building completed in 1935 houses the University Library. This library contains one of the best collections in agriculture and related sciences in the country, with special strength in entomology, botany, chemistry, horticulture, landscape architecture, soil science and animal husbandry, but with large collections, also in literature, history, economics and sociology. There are over 151,000 bound books, and over 50,000 classified pamphlets giving most recent information. The periodical file contains over 800 current magazines, both scientific and popular, and a careful selection of periodical publications of learned societies. The Library is unusually rich in files of journals and publications of Experiment Stations. The Library is open from 7:45 A.M. until 10:00 P.M., Monday through Friday, and from 7:45 A. M. until 5:00 P. M., Saturdays. Sundays the Library is open from 1:45 to 4:45 P.M. and 7:00 to 10:00 P.M.

The building is named in memory of Henry Hill Goodell, President of the University from 1886 to 1904 and Librarian from 1886 to 1898.

AGRICULTURAL OPPORTUNITIES FOR WOMEN

Agriculture is a field in which women have always found some opportunity. There are women farming independently in all branches of agriculture. As a rule poultry raising, small fruits and vegetable growing and floriculture, seem to offer women an easier opportunity than dairy, stock, and general farming. There is little demand for women to fill paid positions on farms or estates. From time to time some positions are available such as the position of agricultural officer in state correctional institutions.

For the woman or girl whose home is already upon the farm the opportunity is better. With the help of an agricultural education there are open to her many means of increasing her own or the farm income. With the knowledge of farm life which she already possesses, and with the possibility of securing occasional help from her family, she may be able to carry on and develop a profitable enterprise of her own. The Stockbridge School of Agriculture offers to the women who wish to engage in farming the practical training which they will need to fit for such work.

Women who are interested in taking agricultural courses should correspond with Mrs. Carol Burr Cornish, Placement Officer for Women.

POSITIONS

The University does not guarantee positions to students registered in any of its courses, but through the Placement Service it has an opportunity to recommend students for a large number of positions. A record is kept of each student's work and experience, and of his success in positions for which he has been recommended after he has finished his course. Opportunities for trained men and women, especially those who have had experience, are good.

A student desiring a recommendation from the university must meet the following conditions:—

- (1) He must be of good character.
- (2) His previous record must be good.
- (3) His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of practical experience cannot, as a rule, be recommended for positions

of responsibility. This is especially true of the better positions for which managers or superintendents are wanted.

VOCATIONAL PLACEMENT

The work of locating first year students for apprentice training from April to October, after the resident term is completed, is in charge of the Director of Placement Service. Placement training for women students is in charge of Mrs. Carol Burr Cornish of the Placement Office. Every effort is made to secure satisfactory positions affording the kind of training desired by the student, but the Placement Office cannot guarantee to place every student for training, when positions are not available. In normal times placement positions are secured for all students who are eligible under these conditions.

1. Positions are secured that will enable a student to gain practical experience in his particular vocation.

2. A student desiring placement at home may arrange for such assignment if the Director of Placement approves. As a rule, it will be found more desirable for a student to spend this six months away from home even though he plans to be employed there after finishing the course. This statement is based on the experience of students who have already taken the course. The parent must request in writing, placement on the home project.

3. If credit is to be secured for the six months' placement training the following rules must be carefully observed.

Rules for Stockbridge Students on Placement

1. The student must interview the Director of Placement early in his first year in order that his qualifications, the type of work he wishes to pursue, and his general fitness may be determined.

2. No final arrangement for placement training may be made by the student himself until the Director of Placement has been consulted.

3. Students are required to complete their period of training without unnecessary absences.

4. No transfers are to be made by a student if he is to receive credit, until permission has been had from the Director of Placement.

5. A position may not be given up by the student until the Director of Placement has been notified.

6. A monthly report must be furnished on the form supplied, and submitted not later than the fifth of each month during his training period.

7. Students must satisfactorily complete all reports as required by the various departments.

8. When a student fails to complete the requirements of his placement training with a satisfactory grade, he is not allowed to take the work of the second year.

9. All students are given a thorough physical examination by the Department of Physical Education at the beginning of each university year. Any disabilities liable to affect the student's placement work are noted, and, if of a serious nature, recommendations for corrective measures are supplied. Parents should understand that most kinds of agricultural work require a well-balanced combination of brawn and brain. No student whose physical condition is questionable will be accepted for placement training without a physician's certificate, and parents' approval.

It should be clearly understood by both employer and employee that the same energy, regularity and general conduct will be expected of the student during his period of placement training as is expected in his work in classes and on the campus.

It should also be noted that this six months' experience is educational in its nature. Students are expected to earn and receive a reasonable wage, but the purpose of the training is the experience gained rather than the wage earned. The scale of wages may vary in different localities, but each man's ability is given very careful thought, that he may obtain a wage that is fair to him. In the event of any misunderstanding the supervisor should be immediately informed.

THE LOTTA AGRICULTURAL FUND FOR GRADUATES ENTERING AGRICULTURAL PURSUITS

(Prepared by the Lotta M. Crabtree University Committee with the approval of the Trustees of the Lotta M. Crabtree Estate.)

A 1940 decision of the Probate Court of Suffolk County made available the Lotta M. Crabtree Agricultural Funds to graduates of the Stockbridge School of Agriculture, as well as to graduates of the four-year course at the University of Massachusetts. This decision does not, however, lessen the restrictions or change the purposes for which these funds can be used for farm financing.

The purpose of loans from these funds is to assist meritorious graduates who are without means in establishing themselves in agricultural pursuits. These loans are made without interest or service charges other than the cost of title search and legal papers. They must, however, be paid back in full amount within a reasonable length of time and there are certain restrictions on their use.

To avoid disappointment on the part of applicants and save unnecessary work and expense in investigating applications for loans, there are certain questions that the prospective borrower should answer for himself before making application for a Crabtree loan. The more important of these follow:

1. Am I thoroughly qualified, both in training and experience, to successfully manage the project that I am planning? Experience on a farm or in the agricultural enterprise contemplated, in addition to classroom training is one of the first essentials for success. If such experience is lacking, it is usually best to delay application for a loan until acquired.

2. Is the project that I seek assistance in financing really an "agricultural pursuit"?

3. Am I using these funds entirely to establish myself in business or are they being used in part to benefit some other person who is not a graduate of the University of Massachusetts or the Stockbridge School? This question sometimes arises in connection with "family" and "partnership" propositions. It has no reference to a wife or other dependent but no part of the loan can be used to finance a person who is not a University or Stockbridge graduate.

4. Am I using these funds for refinancing present debts? The purpose of these loans is to "establish" rather than "reestablish" persons in agricultural pursuits. They cannot be used for retiring present debts.

5. Will the amount that I can hope to borrow from these funds adequately finance the enterprise that I am planning to engage in? Lotta Agricultural loans are used mostly to supplement other forms of financing rather than for complete financing of farming operations. Reasonably definite plans for the other financing, which the loan is intended to supplement, should be worked out before applying for a Crabtree loan.

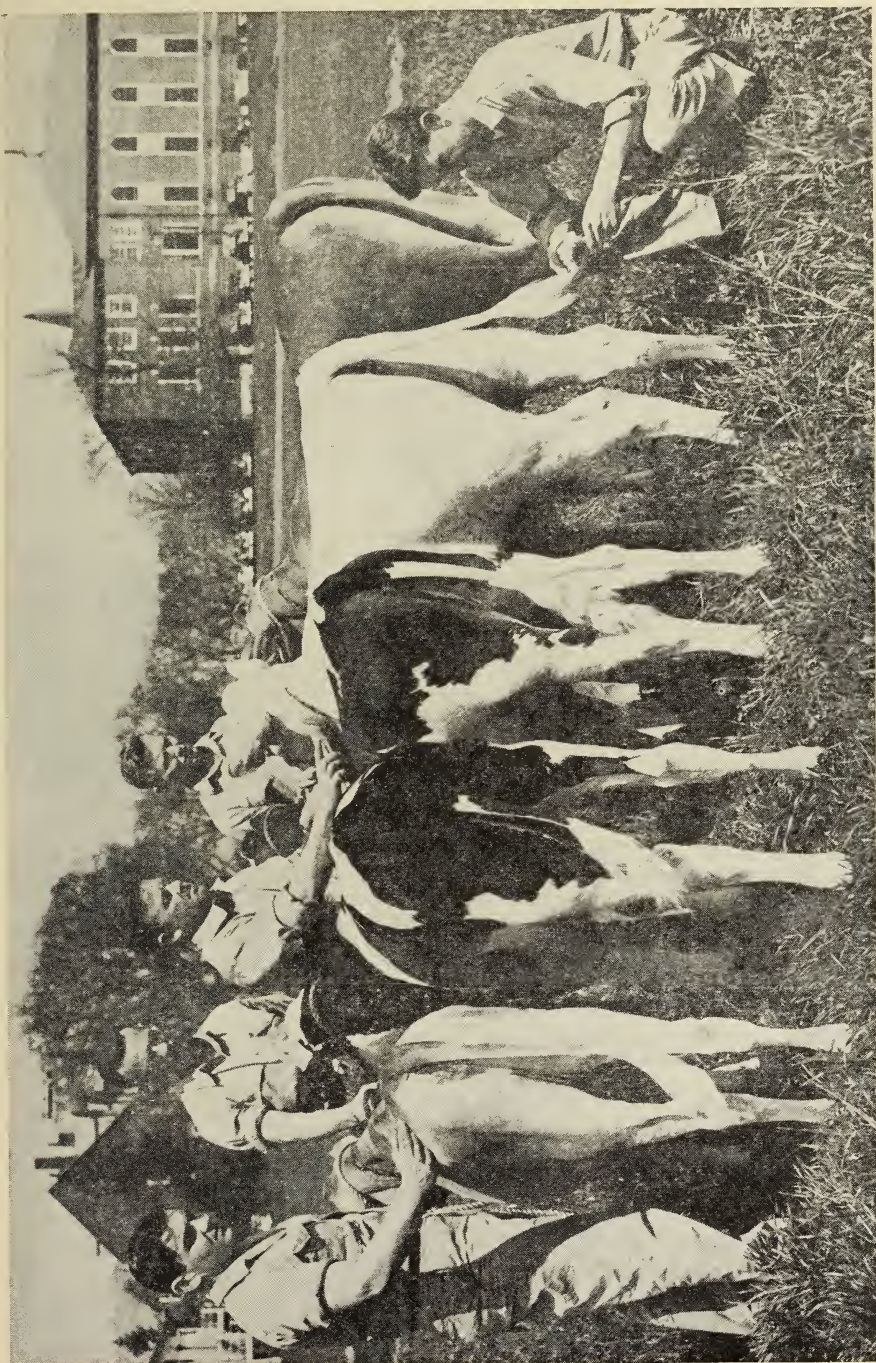
6. What can I offer as security to adequately safeguard this loan? A Crabtree loan, like any other loan, should be safeguarded against possible death or financial failure of the recipient. While character and personal integrity of the applicant are large factors in decisions relative to granting of a loan, adequate security should be provided as far as possible.

7. Can I amortize my debt payments and other financial obligations so that I can repay this loan within a reasonable period of time? Most Crabtree loans are made under definite agreement to repay within a relatively short period of years. The Crabtree applicant should therefore make certain, barring calamity, that his income above necessary operating and living expenses will be great enough to allow annual, semi-annual or monthly payments on this loan as well as on other debt obligations that he may be carrying.

8. Will this loan actually help me to make more money or will it merely delay the time and increase the burden of final financial reckoning? The answer to this question and also to No. 7 involves careful budgeting and planning ahead. Unless an applicant can show on paper

by carefully projected plans and budgets of expected receipts and expenses that he will benefit by a loan, he is likely to have difficulty in repaying it.

Applications for the "Lotta Agricultural Fund" should be addressed to the Trustees of the Lotta M. Crabtree Estate, 619 Washington Street, Boston, Massachusetts, or may be secured at the Short Course Office or the Placement Office at the University. The Director of Placement has been designated as the Stockbridge representative on the faculty committee which makes approval recommendations to the Crabtree trustees. Decisions regarding the granting of a loan rest entirely with the Trustees under the terms of Miss Crabtree's will.



A GROUP OF STOCKBRIDGE CONTESTANTS IN ANNUAL DAIRY CATTLE FITTING AND SHOWING CONTEST

ANIMAL HUSBANDRY

PROFESSOR RICE, PROFESSOR FOLEY, ASSISTANT PROFESSOR COWAN,
ASSISTANT PROFESSOR HALE, MR. J. MURRAY ELLIOT, MR.....

Animal Husbandry, in this School, refers to the breeding, feeding, and management of dairy cattle, beef cattle, horses, sheep and swine.

The purposes of the courses in Animal Husbandry are (1) to provide the student with a thorough understanding of the basic principles involved in the creation of more efficient and more beautiful animal types, said principles being those involved in the biology of animal reproduction, the chemistry of animal growth and feeding and the economics of livestock production; (2) to show the practical workings of these principles in the selection, feeding and management of the various classes of livestock and (3) to provide practice in judging, fitting, showing and general management of livestock as well as the production of milk and other products, and the slaughtering, curing and marketing of meat products.

The University dairy herd comprises about 150 animals in the Ayrshire, Guernsey, Holstein, Jersey and Milking Shorthorn breeds. In beef cattle, we maintain a herd of Aberdeen-Angus and a herd of Herefords; in sheep, flocks of Southdowns and Shropshires; in swine, a herd of Chester Whites; and in horses, a band of Percheron mares and stallions as well as one stallion and several mares and foals in the light horse breeds. Modern barns house the above animals and modern equipment is available for practice work with them.

The University Farm of about 250 acres is handled primarily as a live stock farm, producing pasture, hays, silages and some grain for live stock feeding. The farm is equipped with the most up-to-date machinery for agricultural production. The farm and barns are our laboratories, the animals and accessories our equipment.

The Charles H. Hood Dairy Foundation Prize for Animal Husbandry Seniors

The Charles H. Hood Dairy Foundation Prize of \$200 is awarded annually to seniors who in the judgment of a faculty committee have made an outstanding scholastic record in this major course and who because of their practical qualifications, personality, and character, seem best qualified for success in this field.

Trains for Jobs Like These:

Owners and operators of dairy farms; farm managers; superintendents or foremen; herdsman in various kinds of livestock enterprises; dairy herd association testers; inseminators in artificial breeding units; businesses allied to agriculture such as farm cooperative fieldmen, sales and service men for feed, fertilizer and farm machinery companies.

Field trips will be required during the two years at an estimated cost of \$40 per student.

Special equipment needed for students in Animal Husbandry are: knives, boots, and wash suits, at an estimated cost of \$15.

Animal Husbandry First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Economics S3 (Marketing)
Agronomy S1 (Soil Management)
Animal Husbandry S1 (Principles of Feeding)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Dairy S1 (General Dairying)
Farm Management S3 (Efficiency in Farming Operations)
Physical Education S1 (Required of men students not participating in football; also required of women students)
Milking (Practice periods only, by arrangement)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agricultural Engineering S4 (Farm Shop)
Agronomy S2 (Fertilizers)
Animal Husbandry S2 (Types and Breeds)
Fruit Growing S10 (General Course)
Poultry Husbandry S10 (General Course)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S1 (Farm Power)
 Animal Husbandry S3 (Annual Breeding)
 Animal Husbandry S5 (Farm Meats)
 Business English S1
 Farm Management S1 (Farm Management and Accounts)
 Public Speaking S1
 Veterinary Science S1 (Animal Sanitary Science)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S10 (Farm Structures and Drainage)
 Agronomy S4 (Field Crops)
 Animal Husbandry S4 (Live Stock Production)
 Animal Husbandry S6 (Dairy Cattle and Milk Production)
 Public Speaking S2
 Veterinary Science S2 (Applied Animal Sanitary Science)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

ANIMAL HUSBANDRY S-1. (Principles of Feeding) I.

This course includes a study of the organs of digestion, the digestion and absorption of feeds, the classification and characteristics of the common feed-stuffs, the utilization of feeds in maintenance, growth, fattening; meat, work and milk production. Some time will be spent on the importance of minerals and vitamins. Methods of calculating balanced rations; feeding standards, and feeding practices will be studied. A visit to a feed mill is a requirement of this course.

3 class hours and 1 2-hour laboratory period a week.

Credit, 4.
MR. ELLIOT.

ANIMAL HUSBANDRY S-2. (Types and Breeds) II.

This course considers the origin, history, development, characteristics and distribution of the breeds of cattle, sheep, swine and horses commercially important in the United States. The conditions to which each class of live stock and each breed seem best adapted will be discussed. Laboratory work consists of judging and evaluating as many rings of dairy, dual-purpose, beef cattle, sheep, swine and draft horses as time permits.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.
MR.....

ANIMAL HUSBANDRY S-3. (Animal Breeding) I.

This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and theories of modern genetics, and to show how such knowledge may be utilized through genetic analyses, selection, and systems of breeding for the creation of more beautiful and more efficient animal types. A field trip is made to the Massachusetts Selecting Breeding Association.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.
ASSISTANT PROFESSOR COWAN.

ANIMAL HUSBANDRY S-4. (Live Stock Production) II.

This course deals briefly with the problems of selection, breeding and care of horses, beef cattle, sheep, and swine, with emphasis on their place in New England agriculture. Attention is given to the general situation, equipment, feeding, and management problems. The laboratory periods consist of practice in fitting and showing, shearing, docking and castrating. As a part of the laboratory work, each student will be assigned an animal for fitting and showing in the "Little International" which will be held on a Saturday in March. Trips to other purebred live stock establishments in New England will be required during the semester. The cost of transportation will not exceed \$5.00. Four students in this course will be selected to participate in the New England two-year school judging contest.

Prerequisites: Animal Husbandry S-1 and Animal Husbandry S-2.

3 class hours, 1 2-hour and 1 4-hour laboratory periods a week and trips.

Credit, 5.
ASSISTANT PROFESSOR HALE.

ANIMAL HUSBANDRY S-5. (Farm Meats) I.

This course includes a survey of the packing industry and follows the product (i.e. beef, pork, lamb and veal) from the feed-lot to the consumer's table. Practice is afforded in classifying animals as to market class and grade and in slaughtering, dressing, and cutting beef, pork, lamb and veal. At the end of the course a trip will be taken to several large packing houses in Boston consuming one day and costing about \$10.00. Textbook: Ziegler, "The Meat We Eat."

Special equipment needed for this course includes knives, boots and wash suits, estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR.....

ANIMAL HUSBANDRY S-6. (Dairy Cattle and Milk Production) II.

For Seniors. — This course treats all phases of dairy cattle production and management. The student is provided with an opportunity to study and seek the solution to the various economic, nutritional, genetic and managerial problems concerned in successful dairying. Lectures will be supplemented with talks by specialists in the various fields. Laboratory will consist of a detailed study of methods used on the university farm, with practice in the various skills necessary for the herdsman or showman. A dairy cattle judging team will represent the Stockbridge School of Agriculture in the New England two-year school judging contest. Special judging laboratories will be scheduled to train this team.

Trips to purebred live stock farms for the purpose of inspection and advanced dairy cattle judging will be required during the spring semester. The cost for transportation will not exceed \$15.00. Textbook: Peterson, "Dairy Science."

3 class hours and 2 2-hour laboratory periods a week and trips.

Credit, 5.

PROFESSOR FOLEY, MR. ELLIOT.

ANIMAL HUSBANDRY S-8. (Food Management Meats) II.

For majors in the Food Management Course. This course is designed to impart a knowledge of the fundamental principles involved in judging, purchasing, and efficiently utilizing meat and meat products. Laboratories will involve actual slaughtering, dressing, wholesale and retail cutting and preparation of by-products. Judging practice will be secured in a nearby packer cooler and at the end of the course a one day trip costing \$10.00 will be scheduled to several large packing houses in Boston. Textbook: Ziegler, "The Meat We Eat." Special equipment needed for this course includes knives, boots, and wash suits—estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR.....

ANIMAL HUSBANDRY S-9. (Special Dairy Cattle Course) I.

For Dairy Industry and Poultry Husbandry Majors. This course considers briefly the origin, history, development, characteristics and distribution of the six major dairy and dual-purpose breeds of cattle. The course will cover the basic principles of dairy cattle feeding, including feeding standards and the calculation of balanced rations. The principles of genetics and the art of breeding better dairy cattle will be emphasized. Management of the dairy herd for the health standpoint and for profitable returns will complete the lecture portion of the course. Laboratories will be devoted to judging, feeding, breeding, and various managerial problems. Textbook: Peterson, "Dairy Science."

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

PROFESSOR FOLEY.

Note—Every student in this major must qualify in milking. Arrangements for practice periods and examinations by special assignment. No student will be put in placement training who has not satisfied this preliminary requirement.

DAIRY INDUSTRY

PROFESSOR HANKINSON, ASSISTANT PROFESSOR LINDQUIST,
ASSISTANT PROFESSOR NELSON, MR. FINNEGAN

The Dairy Industry course is designed to fit men for positions with market milk concerns, creameries, ice cream plants, and specialized dairy farms.

All dairy industry courses are given in the dairy building (Flint Laboratory), a building devoted especially to dairy work. The building is well equipped with dairy and creamery machinery.

The market milk department contains two complete pasteurizing units, a clarifier, separator, automatic bottle filler and capper, rotary can washer and automatic soaker type bottle washer with conveyor transfer of bottles to the bottle filler and capper.

The ice cream making room contains a pasteurizing vat, homogenizer, cooler, brine and direct expansion freezers, continuous freezer, and additional equipment such as is found in ice cream plants.

The room designed for cheese making is equipped with cheese vats, draining racks, presses, etc. The butter making room contains power churns, workers, scales and other accessories.

The testing laboratories are well equipped with apparatus for the Babcock, Mojonner, and other tests for the determination of chemical and bacteriological quality of milk products.

Trains for Jobs Like These:

Skilled workers in wholesale and retail dairy plants including laboratory technicians, pasteurizer operators, ice cream mix makers, freezer operators, and fancy form decorators, cheesemakers, salesworkers; also dairy equipment and supply salesmen, fieldmen and Dairy Herd Improvement Association testers. Such training supplemented with sufficient practical experience may lead to positions such as assistant plant superintendents and plant managers.

Field trips will be required during the two years at an estimated cost of \$20 per student.

While working in the dairy laboratories, white suits and rubber footwear are required, at an estimated cost of \$10.00.

Dairy Industry

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Economics S1 (Farm Economic Problems)
Agricultural Economics S5 (Dairy Business Accounting)
Agricultural Engineering S1 (Farm Power)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Dairy S1 (General Dairying)
Practical Science S7
Public Speaking S1
Physical Education S1 (Required of men students not participating in football; also required of women students)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Dairy S2 (Testing Milk Products)
Food Technology S2 (Basic Principles and Freezing)
Food Technology S4 (Special Products)
Practical Science S8
Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
Animal Husbandry S9 (Special Dairy Cattle Course)
Business English S1
Business Management S3
Dairy S3 (Ice Cream Making, Cheese, and other Milk Products)
Dairy S5 (Judging Dairy Products)
Veterinary Science S1 (Animal Sanitary Science)
Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
Agricultural Economics S2 (Marketing)
Agricultural Engineering S6 (Dairy Mechanics)
Bacteriology S4 (Dairy Bacteriology)
Dairy S4 (Market Milk and Butter Making)

Electives

Physical Education S4 (Basketball and Hockey)
Physical Education S6 (Baseball)

DAIRY S-1. (General Dairying) I.

This course takes up the question of the importance of dairying in the United States, and especially in the New England States, giving the development of dairying from the earliest to the present time. It covers the secretion, composition, and properties of milk; reasons for variation in the per cent in fat in different samples of milk; the Babcock test for fat in milk and other dairy products; other common milk tests; the advantage of testing herds. Herd Improvement Associations, advanced registry work; the handling of market milk; soft cheese making, ice cream making, and butter making as applied to general farm conditions. The laboratory work consists in testing milk and dairy products for butter fat, solids, and acidity, together with some dairy plant experience in milk handling, butter making, cheese making, and ice cream making.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR LINDQUIST.

DAIRY S-2. (Testing Milk Products) II.

In this course a study is made of the common tests used in dairy industry processes.

The lectures in this course include a discussion of the application of tests, what they indicate and their importance in the dairy plant.

The laboratory work consists of a study of the various dairy laboratory tests such as sediment, flavor, and total solids of milk; moisture, fat and salt determination in butter; moisture test of cheese; the operation of the Mojonnier tester and the modified Babcock tests for fat in dairy products.

In addition to the testing work students will be required to arrange for work about the plant in order to become familiar with dairy plant practices and the operation of dairy machinery.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR NELSON.

DAIRY S-3. (Ice Cream Making, Cheese, and Other Milk Products) I.

This course deals with the making of ice cream, cheese, condensed, evaporated and powdered milk.

The ice cream making portion of the course includes a careful study of modern methods of manufacturing the common frozen dairy products (ice cream, sherbets, ices, frozen puddings, punches, mousses, etc.).

The lecture work includes a discussion of the history of ice cream making, the ingredients found in ice cream, methods of preparing and standardizing mixes, the freezing process, methods of hardening, marketing, and distribution of the finished product.

The laboratory work involves the preparation and standardization of ice cream mixes, the freezing of ice cream and other frozen dairy products, and laboratory tests for butterfat and total solids in ice cream.

In that part of the course dealing with cheese making, a study is made of the different methods of manufacturing hard and soft cheese (cheddar, brick, cream, neufchatel, olive, nut, cottage, cheese spreads, etc.).

In the lectures the manufacture of the different cheeses is considered, either from the standpoint of marketing the entire milk supply of the dairy or as an economical means of disposing of surplus milk. In the laboratory work the different kinds of cheese are made.

Lectures are also given on the manufacture of the various concentrated products as sweetened condensed, evaporated, and powdered milk; casein, semi-solid buttermilk, dried whey, malted milk, etc.

3 class hours and 3 3-hour laboratory periods a week.

Credit, 8.

ASSISTANT PROFESSOR LINDQUIST, ASSISTANT PROFESSOR NELSON,
and MR. FINNEGAN.

DAIRY S-4. (Market Milk and Butter Making) II.

In that part of the course on market milk, a study of the development of the market milk industry is made. Attention is given to the necessary essentials in producing a high grade milk; the economics of milk production and distribution; food value and uses; the advantages and disadvantages of cooperative milk producers' organizations; the various methods of marketing milk; the transportation, processing and delivery of milk; manufacture and marketing of surplus milk in the form of by-products as cream, cultured buttermilk, chocolate milk, etc.

The laboratory work consists of receiving and making quality tests on milk and the operation of the machinery used in processing market milk.

The buttermaking portion of the course includes studies of milk separation with the selection, care, and use of separators; the pasteurization and ripening of cream; the making and use of starters; a study of churns and churning; modern methods of making butter; tests for moisture, salt, fat, and curd content of butter.

3 class hours and 3 3-hour laboratory periods a week. Credit, 8.

PROFESSOR HANKINSON, ASSISTANT PROFESSOR LINDQUIST,
and MR. FINNEGAN.

DAIRY S-5. (Judging Dairy Products) I.

This course is a study of the grading and evaluating of dairy product quality based upon product flavor, odor, appearance, and body and texture characteristics. Consideration is given to identification and correction of quality defects. Judging of milk, ice cream, butter, cheese, chocolate milk, buttermilk and sour cream will be emphasized.

1 2-hour laboratory period a week.

Credit, 1.
MR. FINNEGAN.

DAIRY S-6. (General Course for Poultry Majors) II.

This course takes up the importance of dairying in the United States, and especially in the New England States.

Lectures will be given on secretion, composition, and properties of milk, reasons for variation in per cent of butter fat in different samples of milk. The Babcock test for fat in milk, cream, skim milk and buttermilk, the advantages of testing herds, herd improvement associations, advanced registry work; the handling of market milk, soft cheese making, ice cream making, and butter making, as applied to general farm conditions.

The laboratory work consists mainly in testing milk and dairy products for butter fat.

3 class hours and 1 2-hour laboratory period a week.

Credit, 4.
MR. FINNEGAN.

DAIRY S-8. (Grading and Marketing of Dairy Products) II.

This course is arranged for students specializing in Food Management to provide a basis for the more intelligent selection of dairy products.

It includes a consideration of the composition, food value, selection, and use of the different dairy products; a careful study of the methods of marketing and grading; a survey of processing methods and types of packages; and laboratory practice in testing milk products and in evaluating and identifying eating quality of milk, butter, cheese, and ice cream.

During the semester a trip will be made to leading dairy wholesale markets in Boston, at an estimated cost of \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.
ASSISTANT PROFESSOR NELSON, MR. FINNEGAN.



CLASS TRIP TO COMMERCIAL TURKEY FARM

POULTRY HUSBANDRY

PROFESSOR JEFFREY, PROFESSOR SANCTUARY, ASSISTANT PROFESSOR BANTA,
ASSISTANT PROFESSOR VONDELL

There are excellent opportunities in poultry work for men and women who have had the proper training. Graduates from this department have taken their places as leaders in the industry and have filled them capably. Some of them own their own breeding farms, manage or assist in the management of commercial egg farms, while others are in those industries which are closely allied with the production and marketing of poultry products.

Seven specialized courses and one general course are offered by this department. Those students who specialize in poultry culture take all eight courses. The general course is designed to give the students specializing in other branches of agriculture and horticulture the fundamental principles underlying successful poultry raising when a sideline on the farm.

The facilities for practical instruction in poultry husbandry include quarters and equipment in Stockbridge Hall for efficient classroom teaching and demonstrations.

The University Poultry Farm, our practical laboratory, comprises classrooms and laboratories which provide facilities for practice in incubation, breeding, feeding, killing, picking, candling and grading eggs, caponizing, judging, sexing, construction of poultry houses and appliances, and other phases of poultry work.

The well-bred flock of about 1,500 adult birds consists principally of White Plymouth Rocks, Single Comb Rhode Island Reds, Barred Plymouth Rocks, Single Comb White Leghorns and New Hampshires. The largest flocks of approximately 150 birds are used primarily for practical experiments and demonstrations in housing, feeding, breeding and management. Equipment includes several types of lamp and mammoth type incubators; many styles of coal and electric brooders and chick batteries for brooding and rearing approximatey 5,000 chicks. A flock of several hundred Jersey Buff Turkeys is maintained.

The practical phases of commercial poultry production are stressed in the courses offered.

Trains for Jobs Like These:

Skilled workers on poultry farms, owner operators and managers; poultry breeding farms; operation of incubators and brooders; wholesale and retail poultry meats; testing, grading and packing eggs; poultry cooperative sales work with eggs, dressed and live fowl; salesmen for poultry feeds and equipment; broiler production and day-old chicks; turkey and duck farms, breeding (record of performance) and disease control (Pullorum) field men.

Field trips will be required during the two years at an estimated cost of \$37 per student. All poultry Stockbridge students will be required to make a trip to the Boston Poultry Show which is held sometime during the month of January. Estimated cost \$6.00.

Poultry Husbandry

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Animal Husbandry S9 (Special Dairy Cattle Course)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Farm Management S3
Poultry Husbandry S1 (Judging and Housing)
Public Speaking S1
Vegetable Growing S9 (General Course)
Physical Education S1 (Required of men students not participating in football; also required of women students)

Second Semester

(Four Weeks Residence Instruction Followed by Seven Months Placement Training)
Dairy S6 (General Course)
Poultry Husbandry S2 (Incubation and Brooding)
Poultry Husbandry S12 (Specialties)
Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S1 (Farm Economic Problems)
 Agricultural Engineering S7 (Farm Structures)
 Fruit Growing S9 (General Course)
 Poultry Husbandry S5 (Marketing)
 Poultry Husbandry S7 (Breeding)
 Veterinary Science S1 (Animal Sanitary Science)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S2 (Farm Power)
 Agricultural Engineering S4 (Farm Shop)
 Business English S2
 Farm Management S2 (Farm Management and Accounts)
 Poultry Husbandry S4 (Feeding)
 Poultry Husbandry S8 (Supervised Reading and Management)
 Veterinary Science S2 (Applied Animal Sanitary Science)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

POULTRY HUSBANDRY S-1. (Judging and Housing) I.

This course embraces a study of the various economically important types of breeds of domestic fowl, judging for egg production capacity, and for exhibition quality. This course also covers the principles and practices of constructing and equipping houses on a commercial poultry farm. A few trips to nearby poultry plants may be taken to study poultry house ventilation. Two credits for judging; three credits for housing.

3 class hours and 2 2-hour laboratory periods a week. Credit, 5.

PROFESSOR SANCTUARY AND ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-2. (Incubating and Brooding) II.

A study of incubation and brooding is made by means of the operation of standard incubators and brooders and through a consideration of basic principles. Students select and grade hatching eggs, operate small incubators and observe mammoth incubators for a period of time. Under supervision each student has charge of a brood of chicks.

The incubation part of the course will consist of three class hours, one laboratory period and one practice period, and will run parallel to the brooding part which will consist of two class hours, one laboratory period and one practice hour.

5 class hours; 2 2-hour laboratory periods and the equivalent of 2 2-hour laboratory periods in incubation and brooding practice. (7 days a week.)

Credit, 9.

PROFESSOR SANCTUARY.

POULTRY HUSBANDRY S-4. (Feeding) II.

A study of the scientific principles of nutrition essential to commercial success, with particular emphasis on vitamins. Rations properly balanced for various purposes will be calculated. A comparative analysis of the different methods of feeding is included. Textbook: "Feeding Poultry" by Heuser—Published by John Wiley & Sons.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-5. (Marketing) I.

A study of preparing eggs and poultry products to meet the requirements of the northeastern markets. Grades, prices and reports are studied in conjunction with different marketing methods. The laboratories are designed to cover the field of practical grading, internal study, candling and packing of eggs as well as selection, fattening and killing and dressing poultry by the latest approved methods.

A one-half day class trip to Springfield markets in December is required. Estimated cost, \$2.00. Text: Benjamin, Pierce and Termohlen's "Marketing Poultry Products".

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

ASSISTANT PROFESSOR VONDELL.

POULTRY HUSBANDRY S-7. (Breeding) I.

This course includes the study of the improvement of poultry by means of mass selection, cockerel progeny, flock improvement, and pedigree methods of breeding. Students follow through each step of a pedigree hatch and assist in the selection of the breeders used at the university plant. Basic principles of heredity necessary for an understanding of good breeding practices are studied. A textbook costing \$3.00 to \$4.00 will be required.

4 class hours and 1 2-hour laboratory period a week.

Credit, 5.

PROFESSOR SANCTUARY.

POULTRY HUSBANDRY S-8. (Supervised Reading and Management) II.

Each student will be assigned references in the field in which he is most interested. Oral reports will be required. A major part of the work will be the writing of a term paper and students will be graded on their ability to summarize reference reading and on the neatness of their work. Required day trips totalling three or four days to representative commercial poultry areas are made at an approximate cost of \$30.00 per student. The basic factors essential to a financially successful poultry enterprise are analyzed.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-9. I.

This course covers candling and grading of eggs, market classification, a study of eggs in the local markets, dressing poultry and various ways of preparing poultry for the table. Prices and market operations form an active part of the course.

A one-half day class trip to the Springfield markets in December is required. Estimated cost, \$2.00.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR VONDELL.

POULTRY HUSBANDRY S-10. (General Poultry Husbandry) II.

Poultry keeping as a national industry; its importance and geographical distribution; opportunities and possibilities in poultry culture in Massachusetts; principles of feeding; utility classification of fowl; incubation; the production of hatching eggs; the baby chick industry; and brooding and rearing. Practical exercises will be closely correlated with the study of breeds and varieties, various types of incubators, brooders, brooder-houses, etc. Textbook: Jull, "Successful Poultry Management." Note: Students who take course S-10 must get permission from the Poultry Department to take advanced poultry courses.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.

ASSISTANT PROFESSOR VONDELL.

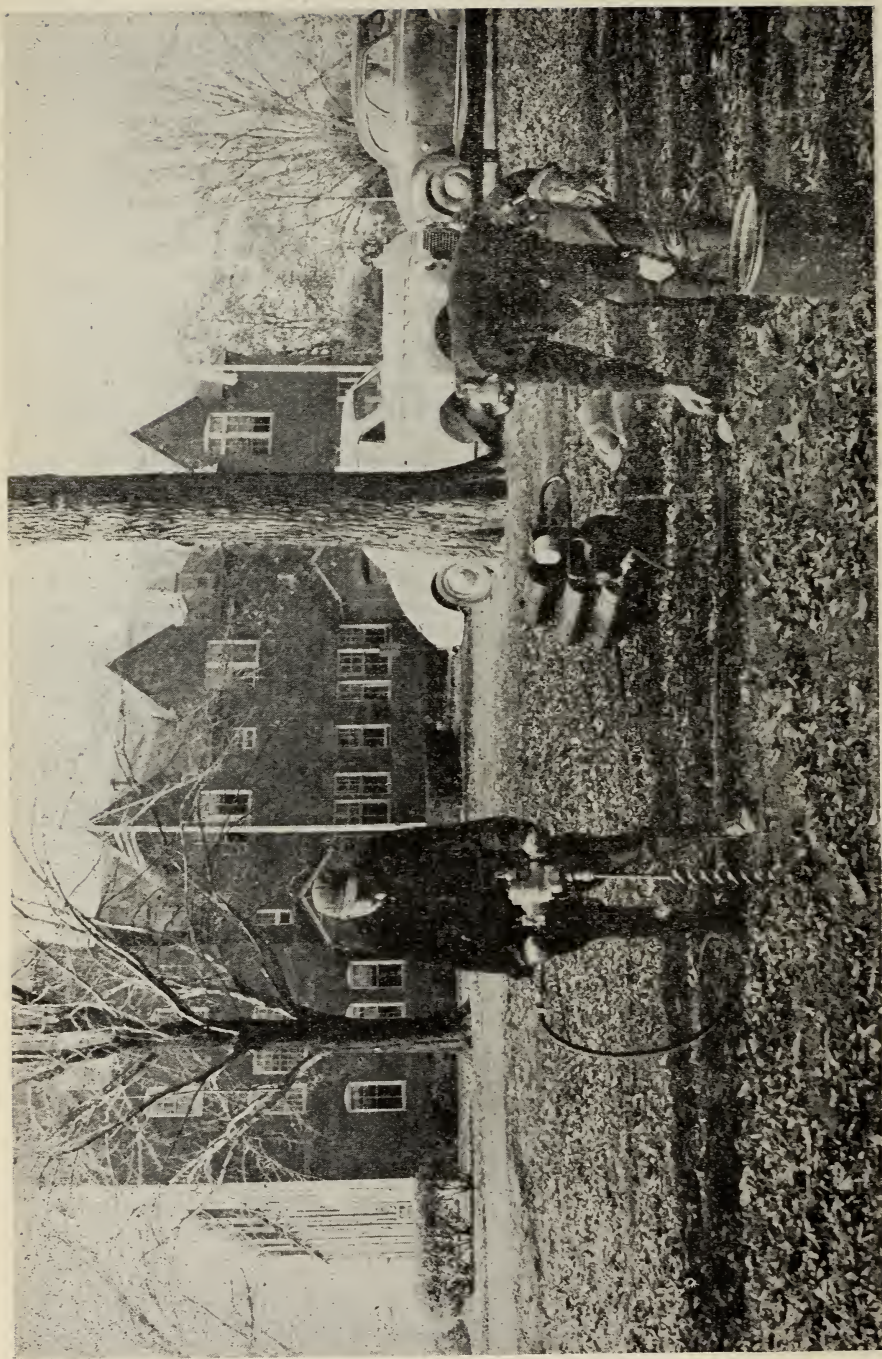
POULTRY HUSBANDRY S-12. (Specialties) II.

Turkeys, ducks, geese, and game birds are considered. Breeding, incubation, feeding, rearing, management, marketing, housing, and disease control methods and practices are studied. Most of the course is devoted to the study of turkeys. Textbook: Jull, "Raising Turkeys."

4 class hours a week.

Credit, 4.

PROFESSOR JEFFREY.



SHADE TREE FEEDING

ARBORICULTURE

ASSISTANT PROFESSOR KING.

Arboriculture is the care of trees. It includes tree planting; large tree moving; diagnosis and treatment of tree diseases, defects, and mechanical injuries; identification and control of tree insect pests; fertilizing; pruning and repair of storm or otherwise damaged trees; and removal of dead or undesirable trees. A growing appreciation of the value of trees and a demand for a tree maintenance service has led to the development of organizations to supply it. These firms desire trained men. All Massachusetts towns are required to elect tree wardens. The men who accept this responsibility should be trained in the requirements of trees and their care. This course is designed to give this basic training in the care of shade and ornamental trees to supply these needs.

This University offered the first course in the country on shade tree care in 1895, and since then a very high degree of interest in shade trees has been maintained here. Annually in March a school of one week's duration for tree wardens is held on the campus. This school brings together tree wardens and men interested in tree care to discuss their problems. Parts of the program of the school will be of interest to students in this course.

Our large campus has a wide variety of trees of all ages with which the student becomes acquainted, and which also serves as a laboratory for problems similar to those one will have to meet in practice. The research laboratory in shade tree diseases for the state is also located on the campus.

The Massachusetts Arborists' Association and the Massachusetts Tree Wardens and Foresters Association have approved this course as a basic training program.

Due to limited quota of twenty students in each class and need for careful selection of candidates based on physical qualifications and business objectives, as well as adequate scholastic preparation, a personal interview is required of all applicants before final acceptance can be given.

Those electing Arboriculture must register two weeks prior to the opening of the fall semester for the preliminary training period. Applicants will be notified of the date of registration. This two-week period before the start of regular class work will be used for intensive training in the use of ropes, climbing, and the use of knots and safety practices. Eight hours a day will be given over completely to this purpose. Only those who qualify in this preliminary program will be permitted to take the course in Arboriculture. Those who do not qualify may take the Ornamental Horticulture course. All students applying for the course must have a doctor's certification that they are physically fit. Any heart ailment or other serious weakness automatically disqualifies an applicant.

The University campus of about 700 acres, affords an excellent outdoor laboratory for plant identification, tree work and tree diseases.

Field trips will be required during the two years at an estimated cost of forty dollars, other than those conducted during laboratory periods.

Trains for Jobs Like These:

Operators, foremen and salesmen for arboriculture firms, utility line clearance foremen, deputy tree wardens and eventually tree wardens in towns and cities, tree care in estates, parks, state highways, college campuses or grounds of other public institutions, developing one's own service organization for the practice of arboriculture.

Recommended clothes for tree climbing: breeches, good heavy work-shirts.

All students qualifying will be required to obtain personal tools for cavity work, a hand saw, and a pair of 14" or 16" high top shoes with rubber or composition soles and heels at an approximate cost of \$50.00.

Arboriculture**First Year****First Semester**

(Eighteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Agronomy S5 (Construction and Maintenance of Fine Turf Areas)
 Arboriculture S0 (Tree Climbing. Special Qualifying Course)
 Arboriculture S1 (Practices and Policies)
 Botany S1 (Tree Physiology)
 Horticulture S1 (Plant Materials, Trees)
 Public Speaking S1
 Physical Education S1 (Required of men students not participating in football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agronomy S2 (Fertilizers)
 Arboriculture S2 (Continuation of S1)
 Botany S2 (Diseases of Trees and Shrubs)
 Entomology S2 (Insect Pests of Trees, Shrubs, and Greenhouse Plants)
 Horticulture S2 (Plant Propagation)
 Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year**First Semester**

(Sixteen Weeks Resident Instruction)
 Arboriculture S3 (Diagnosis and Control)
 Arboriculture S7 (Shade Tree Surveys and Cost Estimates)
 Business English S1
 Entomology S5 (Shade Tree, Shrub, and Ornamental Plant Insects)
 Forestry S3 (Woodland Management)
 Horticulture S3 (Surveying and Mapping)
 Physical Education S5 (Required of men students not participating in football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S4 (Diagnosis and Control)
 Arboriculture S6 (Shade Tree Spraying)
 Arboriculture S8 (Shade Tree Surveys and Cost Estimates)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Horticulture S4 (Landscape Construction Problems)
 Horticulture S6 (Plant Materials, Shrubs)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

ARBORICULTURE S-0. (Tree Climbing) I.

For two weeks previous to the regular opening of school, all students electing this major will attend a special qualifying course in tree climbing. This course will be conducted on the campus for eight hours each day for two weeks to acquaint the student with ropes, tools, and climbing techniques. To be enrolled in the arboriculture major all students must pass this qualifying tree climbing practice.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-1. (Practices and Policies) I.

Factual material covering the phases or types of work; pruning, cabling, bracing, fertilization and line clearance. Laboratory work in the application of class discussion. A one day trip to attend the annual meeting of the Massachusetts Arborists' Association.

2 class hours and 1 4-hour laboratory period a week. Credit, 4.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-2. (Continuation of S-1) II.

Soils, their origin, structure and function as pertaining to tree growth and development. Fertilizers, their use, sources, application and functions of their elements in the growth and development of a tree. Cuts and fills and their treatment and simple cavity treatments. Attendance required at the annual meeting of the Massachusetts Arborists' Association.

Tree planting and maintenance programs following the closing of the regular eight week session. One week of training in tree moving, fertilization, and cabling. During this week of training the students will spend all their time in the field. There will be no scheduled classes in any other courses.

2 class hours and 1 4-hour laboratory period a week. Credit, 4.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-3 and S-4. (Diagnosis and Control) I. II.

Individual and class assignments in the diagnosis of infectious and non-infectious diseases and the proper treatments and corrective measures. Analysis of symptoms and effects common to diseases and environmental influences. Methods and techniques used to determine the causes and

their treatments. A one day trip to the Arnold Arboretum to study tree types.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
ASSISTANT PROFESSOR KING.

ARBORICULTURE S-6. (Shade Tree Spraying) II.

Spray materials, equipment, and charts for shade tree insects, fungi, and weed control. The laboratory periods will be devoted to the actual application of spray material in the field. Attendance required at the annual meeting of the Massachusetts Tree Wardens and Foresters' Association.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
ASSISTANT PROFESSOR KING.

ARBORICULTURE S-7 and S-8. (Shade Tree Surveys and Cost Estimates) I. II.

The use and determination of shade tree surveys. Time and cost estimates and shade tree maintenance programs as determined by shade tree surveys. City planting and planning programs essential for city and street tree care and development. Advanced work in cavity treatments, bracing and cabling.

Arboriculture S-7 — A one day trip to attend the Annual Meeting of the Massachusetts Arborists' Association.

Arboriculture S-8 — A three day field trip to Connecticut and New York Botanical Garden to visit private, municipal and research organizations.

1 class hour and 1 4-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR KING.

— Agriculture Is Big Business —

Few farm people and comparatively few other citizens realize the importance of agriculture in this commonwealth of ours according to James A. Dayton, Associate Dean and Director of the University of Massachusetts Extension Service.

Massachusetts is an urban, industrial state; 90 per cent of its people live in urban centers. However, 95 per cent of the land area is rural countryside. Here 10 per cent of the population lives, but only about one-third of these are actually engaged in agriculture. In spite of this small number agriculture is a big business. It is the third largest industry in the state, outranked only by leather and textiles. The farm industry in Massachusetts represents an investment of over \$330,000,000 and in 1950 produced a gross income of approximately \$175,000,000.

In addition to the 3 per cent engaged directly in agricultural production 3 to 4 per cent are in allied industries. In other words these people are serving farmers by obtaining farm supplies and services, and by providing marketing facilities. This means approximately 100,000 jobs with 3,000 to 5,000 replacements each year in order to maintain the industry.

COMMERCIAL VEGETABLE GROWING

PROFESSOR SNYDER, ASSISTANT PROFESSOR TUTTLE, MR. JOHNSON

There are many opportunities for both men and women who complete the Stockbridge School vegetable growing courses. These include the operation of a market garden, truck crop, or greenhouse business; skilled employees of commercial operators; operators or trained employees in the many types of wholesale and retail marketing; employees in responsible positions on private estates, private and state institutions as well as with commercial companies handling agricultural products such as fertilizers, seed and various supplies and equipment.

The production and marketing of vegetable crops is a highly specialized business involving a background of technical training as well as a knowledge of practical skills. The staff and facilities of the Department of Vegetable Growing are well qualified and adequate to give a thorough training to students in the fundamentals essential to growing, harvesting and marketing the many vegetable crops commonly grown in New England.

In addition to the facilities of the Department, trips will be made to several production areas and markets to observe actual operations.

Trains For Jobs Like These:

Skilled workers on market garden and truck farms, growers of commercial vegetable crops in greenhouses, cold frames, and fields. Operating all types of farm machinery, tractors, cultivators, seeders, both motor and horse-drawn; preparing crops for market, sorting, grading, bunching, packing. Wholesale and retail sales and distribution. Workers for seed-growing firms, plant breeding and field work on testing plots. Operators, owners, managers of vegetable crop farms. State and federal market inspectors on commercial grades and packs. Buyers and inspectors for dehydration and quick freezer plants. Institutional farm managers.

Field trips will be required during the two years at an estimated cost of \$40 per student.

Commercial Vegetable Growing

First Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Floriculture S3 (Greenhouse Management)
 Fruit Growing S1 (Growing Tree Fruits)
 Public Speaking S1
 Vegetable Growing S1 (Principles of Vegetable Culture)
 Vegetable Growing S3 (Systematic Vegetable Growing)
 Physical Education S1 (Required of men students not participating in football; also required of women students)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agronomy S2 (Fertilizers)
 Floriculture S2 (Greenhouse Construction and Heating)
 Fruit Growing S2 (Orchard and Vineyard Pruning)
 Poultry Husbandry S10 (General Course)
 Public Speaking S2
 Vegetable Growing S2 (Principles of Vegetable Culture)
 Vegetable Growing S12 (Diseases, Insects, and Their Control)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S1 (Farm Power)
 Agricultural Engineering S9 (Drainage and Farm Structures)
 Beekeeping S1 (Fall Management, Wintering, Honey, and Bee Diseases)
 Business English S1
 Fruit Growing S7 (Small Fruits)
 Vegetable Growing S5 (Market Practices)
 Vegetable Growing S7 (Commercial Vegetable Growing)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Beekeeping S2 (Spring Management, Pollination and Honey Production)
 Farm Management S2 (Farm Management and Accounts)
 Food Technology S2 (Basic Principles, Freezing, Canning and Pickling)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Vegetable Growing S4 (Vegetable Forcing)
 Vegetable Growing S6 (Marketing Methods)
 Vegetable Growing S8 (Commercial Vegetable Growing)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

VEGETABLE GROWING S-1. (Principles of Vegetable Culture) I.

Lecture periods are devoted to discussions covering certain fundamental principles of plant structure and growth as they influence and regulate commercial vegetable culture. The work in the laboratory includes detailed studies in seedage, plant growing, manures and fertilizers, garden planting, pests, storage and marketing.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
 ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-2. (Principles of Vegetable Culture) II.

Lectures are devoted to discussions of the more important environmental factors of the soil and climate which regulate plant growth and reproduction, including water, temperature, light, humidity and wind.

3 class hours a week. Credit, 3.
 MR. JOHNSON.

VEGETABLE GROWING S-3. (Systematic Vegetable Growing) I.

This course is designed to acquaint the student with the identification, nomenclature and classification of the standard types and varieties of vegetables; judging and exhibiting; seed production and variety improvement work.

1 class hour 2 2-hour laboratory periods a week. Credit, 3.
 ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-4. (Vegetable Forcing) II.

A study of the principles and practices involved in growing, harvesting and marketing of vegetable crops commonly grown in forcing structures, especially tomatoes, cucumbers, lettuce, mushrooms and rhubarb. Discussions will also include the growing and handling of vegetable plants for field setting, in plant houses, hotbeds and cold frames.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
 ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-5. (Marketing Practices) I.

A study of the various factors and practices involved in harvesting, preparing for market (bunching, tying, wrapping, waxing), grading, packaging, packages used, brands and inspection of vegetables for various market outlets as well as packing house facilities and storage. Trips to nearby and Boston markets will cost approximately \$10.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
 PROFESSOR SNYDER.

VEGETABLE GROWING S-6. (Marketing Methods) II.

A continuation of the studies in S-5 covering the marketing of vegetables with emphasis on advertising, salesmanship, roadside markets, wholesale and retail outlets, market reports and transportation by truck, rail and plane.

3 class hours a week. Credit, 3.
 PROFESSOR SNYDER.

VEGETABLE GROWING S-7. (Commercial Vegetable Culture) I.

Problems and practices of the commercial grower are discussed as they involve seedage, planting, cultivation, irrigation, tools, machinery, farm organization, and management.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. JOHNSON.

VEGETABLE GROWING S-8. (Commercial Vegetable Culture) II.

This is a continuation of Vegetable Growing S-7 in which the discussions involve the cultural practices for the various vegetables that are of commercial importance in the New England area. Organized trips to market gardening areas are required which cover a period of approximately three days and cost about \$30.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-9. (General Course) I.

This course is designed to meet the needs of students in other majors who cannot devote more than one semester to a study of vegetable growing. Attention is to be given to starting plants early, transplanting, seeding, fertilizing, spraying, dusting, harvesting, marketing, and storing the more important vegetable crops.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. JOHNSON.

VEGETABLE GROWING S-12. (Diseases, Insects and Their Control) II.

This course is intended to give those students majoring in vegetable growing an understanding of the more common insects and diseases which attack vegetable plants and the most satisfactory methods for controlling these pests.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.
ASSISTANT PROFESSOR TUTTLE.

To provide food enough for only "fairly adequate diets" for all of the people of the United States 10 years hence, would require as many poultry products as are now produced, more fruits, 50 percent more vegetables and a third more dairy products. Per capita consumption of these commodities is increasing. Fortunately these are the important farm products produced in Massachusetts.

Massachusetts farmers are producing more now than ever before.—in their 330 years of history. Whether or not Massachusetts agriculture will continue to expand and prosper with the increasing demands for our products, depends upon our ability to increase farm production efficiency through research, education, and the adoption of improved practices such as animal breeding and feeding, plant breeding and fertilization, saving labor, and raising part of our own feed nutrients through improved hay and pasture production.

FLORICULTURE

PROFESSOR THAYER, ASSISTANT PROFESSOR HUBBARD,
ASSISTANT PROFESSOR ROSS, MR. DUNHAM

Students who complete the major in Floriculture are fitted primarily for work in commercial and private estate greenhouse establishments and retail flower stores. After gaining experience such students may be able to start in business for themselves. With the courses in Ornamental Horticulture they should be qualified for positions on private estates, in parks, or in nurseries.

The offices and classrooms of the Department are located in French Hall. Of the two lecture rooms, one will accommodate 80 students, the other 30 students; a laboratory, equipped with slate-covered tables, will accommodate 40 students; the greenhouse laboratory for 20 students provides excellent facilities for much of the practical work. In the basement of the building there are located a specially prepared room for bulb storage, a fertilizer and tool room, and space for general storage purposes.

The glass area of the Department consists of approximately 14,000 square feet divided as follows: (1) the French Hall range of 11,800 square feet, a modern, practical, commercial range including propagating, palm and fern, chrysanthemum, carnation, rose and student houses; (2) approximately 2,200 square feet in cold frames and hotbeds. In addition, the Department has the use of the materials in the Durfee Plant Houses, an old range of 7,400 square feet, which houses primarily a collection of tropical, decorative, and other conservatory plants.

Land is available for the outdoor culture of florists' crops. A small perennial garden and a small rose garden are maintained.

Trains For Jobs Like These:

Skilled workers in commercial greenhouses and on private estates, growing all types of flower crops; wholesale and retail florists, growers, salesmen, managers; flower arrangement work, designers and decorators in retail flower stores; salesmen for florists' supplies and equipment.

Students who major in Floriculture are required to purchase in the first semester of the first year, Taylor's Garden Dictionary, estimated at \$5.00.

Field trips will be required during the two years at an estimated cost of \$20.00.

Floriculture

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Floriculture S1 (Garden Materials)
Floriculture S3 (Greenhouse Management)
Horticulture S1 (Plant Materials)
Public Speaking S1
Vegetable Growing S1 (Principles of Vegetable Culture)

Physical Education S1 is required of men students not participating in football; also required of women students

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agronomy S2 (Fertilizers)
Botany S2 (Diseases of Trees and Shrubs)
Entomology S2 (Insect Pests of Trees, Shrubs, and Greenhouse Plants)
Floriculture S2 (Greenhouse Construction and Heating)
Horticulture S2 (Plant Propagation)
Public Speaking S2
Vegetable Growing S2 (Principles of Vegetable Culture)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S3 (Farm Shop)
 Business Management S1 (Fundamentals of Business Management)
 Floriculture S5 (Commercial Production)
 Floriculture S7 (Flower Arrangement)
 Fruit Growing S7 (Small Fruits)
 Horticulture S7 (Grounds Maintenance)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Business English S2
 Floriculture S6 (Commercial Production)
 Floriculture S8 (The Uses of Herbaceous Plants)
 Floriculture S10 (Conservatory Plants)
 Horticulture S6 (Plant Materials)
 Vegetable Growing S4 (Vegetable Forcing)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FLORICULTURE S-1. (Garden Materials) I.

A study of the annuals, biennials, herbaceous perennials, and bedding plants which are commonly used in commercial floriculture and in private estate work. Methods of propagation, culture and uses are considered. Laboratory exercises include work in propagation, planting, identification of materials, and planning of beds and borders.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. DUNHAM.

FLORICULTURE S-2. (Greenhouse Construction and Heating) II.

The origin, growth, and importance of the floricultural industry; types of greenhouses, types of construction, painting, glazing, ventilators, beds and benches, and methods of heating. Trips may be taken to visit greenhouse ranges in the vicinity of Amherst with university transportation.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR THAYER and
ASSISTANT PROFESSOR ROSS.

FLORICULTURE S-3. (Greenhouse Management) I.

A study of the principles of greenhouse management including the consideration of soils, fertilizers, watering, ventilation, temperature regulation, insect and disease control.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSISTANT PROFESSORS HUBBARD AND ROSS.

FLORICULTURE S-5. (Commercial Production) I.

Courses S-5 and S-6 are devoted to a consideration of the important commercial crops. Special attention is given to the culture (under glass) of carnations, roses, chrysanthemums, sweet peas and snapdragons. Other cutflower crops and seasonal pot plants are also considered. Modern methods of production including soilless culture and subirrigation practices are discussed in detail.

All members of the class may be required to take a one-day trip to visit a large commercial greenhouse range at an approximate cost of \$10.00 each.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSISTANT PROFESSOR HUBBARD.

FLORICULTURE S-6. (Commercial Production) II.

A continuation of Floriculture S-5.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSISTANT PROFESSOR HUBBARD.

FLORICULTURE S-7. (Flower Arrangement) I.

The lectures include a discussion of the principles and techniques underlying the use of flowers in corsages, wedding bouquets, vase, bowl, and basket arrangements, table decorations, funeral designs and sprays, and decorations for public functions. The study of color and color harmonies is also considered in this course. The laboratory periods provide opportunity for actual practice in making the various types of arrangements which are considered in the classroom.

Students enrolled in this course are required to take a one day trip to attend the United Florists' Trade Fair and School in Boston.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
ASSISTANT PROFESSOR ROSS.

FLORICULTURE S-8. (The Uses of Herbaceous Plants) II.

This course is a continuation of Floriculture S-1 and is intended for students majoring in Floriculture and Ornamental Horticulture. It provides opportunity for a more detailed study of many of the plants considered in the preceding course with special emphasis on their uses in gardens and in other types of landscape planting. Lectures, assigned readings, study and identification of plants, planning of borders and gardens.

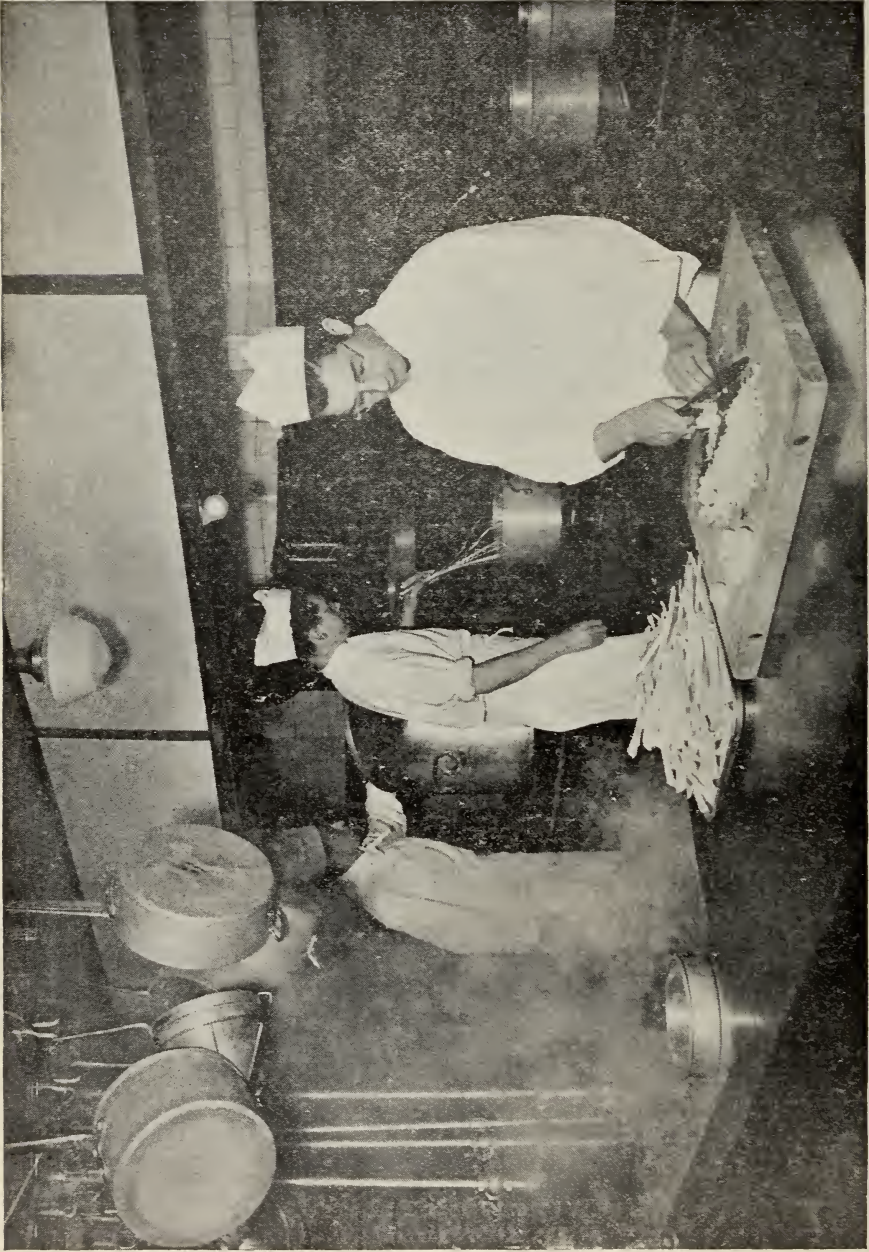
Students enrolled in this course take a one-half day trip to attend the Western Massachusetts Flower Show in Springfield.

2 class hours and 1 4-hour laboratory period a week. Credit, 4.
ASSISTANT PROFESSOR HUBBARD and MR. DUNHAM.

FLORICULTURE S-10. (Conservatory Plants) II.

A study of the plants, both foliage and flowering, used in conservatories and in decorative work or sold in the retail flower shop. Methods of propagation, culture, uses and identification of plants are included in the course. Trips may be taken to visit the conservatories at Smith and Mount Holyoke Colleges with university transportation.

1 class hour and 1 2-hour laboratory period a week. Credit, 2.
PROFESSOR THAYER and MR. DUNHAM.



A LABORATORY EXERCISE IN FOOD MANAGEMENT—UNIVERSITY CAFETERIA

FOOD MANAGEMENT

PROFESSOR FELLERS, ASSOCIATE PROFESSOR LEVINE, ASSISTANT

PROFESSOR KRANZ, DR. NEBESKY

Food management work in all its various trade sub-divisions is closely allied to food production work. Purchasing agents for wholesale and retail food chains must know vegetables and fruits of all kinds, meats, and dairy products such as milk, butter, cheese and ice cream; poultry products such as fowl, ducks, turkeys, and all kinds of eggs and egg products. This same knowledge of superior grades, varieties, and packs of all agricultural products, as well as the modern methods of cooling, freezing, preserving, processing, and serving, is highly essential to the hotel and restaurant industry for its supply of future managers, stewards, and operators. Lunchroom, tearoom, and all summer resort operators should have thorough training in the procurement of food supplies of superior quality if trade competition and public demands are to be efficiently and economically controlled.

Modern methods of food processing including canning, freezing, dehydration and packing, place a greater responsibility on institutional buyers. Sound knowledge in food production methods may be considered essential to the complete training of stewards, food managers, and restaurant operators. Railroad and aviation dining service offer large new fields for food management efficiency and service.

Planning of menus and preparation of food is studied and practiced in this course, along with a complete survey of the whole food production program in agriculture. The excellent equipment of the farms, orchards, food, technology laboratories and dining halls, is a major factor for thorough training which this University provides.

This course is sponsored by the Massachusetts Hotel Association and by the Massachusetts Restaurant Association whose members are cooperating in the placement and employment of students and graduates. The Boston Stewards Club has generously donated an annual scholarship prize fund and the state hotel association has established a loan fund for student aid.

The Food Management course is given with the cooperation of the University dining halls under the management of Mr. Walter O. Johnson.

Due to limited quota of fifteen students in each class and need for careful selection of candidates based on scholastic preparation, business objectives, and experience factors determining choice of course, a personal interview is required of all applicants before final acceptance can be given. Students who select Food Management as a major should have completed a four year high school course.

Trains For Jobs Like These:

Assistant cooks, cooks, stewards, in restaurants, cafeterias, hotels, country inns and vacation resorts serving both summer and winter clientele. All New England states have a huge business in their country areas providing home-grown foods and food products for the year-round vacation trade. Many farm homes and boarding houses rely on this type of business for a considerable part of their income. New England foods from shore and farm have earned a distinctive quality which this course seeks to maintain.

For butchering and dressing all kinds of livestock, and preparation of commercial meat cuts and products. For quick freezing all types of farm products for commercial sale or for freezer locker plants, their operation and maintenance. For work in canning and preserving plants.

Field trips will be required during the two years at an estimated cost of \$15.00 per student.

It is required that all students purchase the manuals of the American Restaurant Institute at a cost of approximately \$25.00 each year.

Food Management**First Year****First Semester**

(Sixteen Weeks Resident Instruction)
 Foods and Nutrition S1 (Basic Food Principles, Meal Planning and Service)
 General Mathematics S1
 Introduction to Stewarding S1
 Kitchen Administration S1
 Menu Planning S1
 Poultry Husbandry S9
 Practical Science S7
 Public Speaking S1
 Vegetable Growing S5 (Marketing Practice)
 Quantity Foods S1 (Preparation and Service)
 Wines S1
 Physical Education S1 (Required of men students not participating in football)

Second Semester

(Sixteen Weeks Resident Instruction followed by four months Placement Training)
 Agricultural Engineering S12 (Food Handling Equipment)
 Food Technology S2 (Basic Principles, Freezing, and Canning)
 Hotel Accounts S2
 Practical Science S8
 Public Speaking S2
 Quantity Foods S2 (Preparation and Service)
 Special Lectures S2
 Wines S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year**First Semester**

(Sixteen Weeks Resident Instruction)
 Bacteriology S3 (Food Sanitation)
 Entomology S3 (Structural Pests)
 Foods and Nutrition S3 (Elementary Nutrition)
 Food Technology S5 (Food Manufacturing)
 Fruit Growing S11 (Fruits and Fruit Handling)
 Kitchen Administration S3
 Quantity Foods S3 (Preparation and Service)
 Storekeeping S1
 Physical Education S5 (Required of men students not participating in football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S4 (Marketing)
 Animal Husbandry S8 (Food Management Meats)
 Business English S2
 Dairy S8 (Grading and Marketing of Dairy Products)
 Food Service S2
 Hotel Accounts S4
 Menu Planning S2
 Special Lectures S4

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

AGRICULTURAL ECONOMICS S-4. (Marketing) II.

This course is designed to give instruction in purchasing and in management for Hotel Stewards. A study of the distribution system for food products will be given as well as merchandising practices, store location, advertising and personnel management.

2 class hours a week.

Credit, 2.

PROFESSOR LINDSEY.

AGRICULTURAL ENGINEERING S-12. (Food Handling Equipment) II.

A study of the principles of operation, the care and maintenance of kitchen and other equipment used in food preparation for large groups. Refrigeration, heating and cooking, cleaning, and lighting equipment, as well as pumps and electrical appliances are covered in exercises which give incidental practice in soldering, pipe fitting, and the selection of proper wire size.

Through the cooperation of commercial agencies, a one-day period of special instruction on industrial kitchen equipment and commercial lighting applications is provided.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR TAGUE.

ANIMAL HUSBANDRY S-8. (Meats Course) II.

For Seniors in the Food Management Course. This course is designed to impart a knowledge of the fundamental principles involved in judging, purchasing, and efficiently utilizing meat and meat products. Laboratories will involve actual slaughtering, dressing, wholesale and retail cutting, and preparation of by-products. Judging practice will be secured in a near by packer cooler and at the end of the course a one day trip costing \$10.00 will be scheduled to several large packing houses in Boston. Text-book: Ziegler, "The Meat We Eat." Special equipment needed for this course includes knives, boots, and wash suits,—estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR HALE.

BACTERIOLOGY S-3. (Food Sanitation) I.

This course includes a general study of micro-organisms responsible for the common diseases of man and the methods employed in their detection and control. It introduces the student to the application of bacteriological principles in the analysis of water, milk and milk products, and other food substances. Bacteria, molds, and yeasts are studied as living agents responsible for the decay, spoilage and infection of foods. The importance of the proper control of these living agents in the production and ripening of certain foods is considered. The conditions necessary for microbial growth and factors responsible for the universal distribution of micro-organisms are studied. The application of sanitation, chemical preservatives and physical and environmental conditions in the control of food infection or spoilage is discussed and demonstrated.

This course is designed to give students interested in the practical problems of food sanitation, spoilage, handling, and preservation a better understanding of bacteria and an appreciation of their importance in the sanitary production and handling of foods.

2 class hours and 1 3-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR PERRIELLO.

DAIRY S-8. (Grading and Marketing of Dairy Products) II.

This course is arranged for students specializing in Food Management to provide a basis for the more intelligent selection of dairy products.

It includes a consideration of the composition, food value, selection, and use of the different dairy products; a careful study of the methods of marketing and grading; a survey of processing methods and types of packages; and laboratory practice in testing milk products and in evaluating and identifying eating quality of milk, butter, cheese, and ice cream.

During the semester a trip will be made to leading dairy wholesale markets in Boston, at an estimated cost of \$15.00.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
ASSISTANT PROFESSOR NELSON,
MR. FINNEGAN.

ENTOMOLOGY S-3. (Structural Pests) I.

This course is offered during the first eight weeks of the first semester. General introduction to Entomology, followed by studies and discussions of more important pests with which hotel stewards would come in contact.

1 class hour and 1 2-hour laboratory period a week. Credit, 2.
PROFESSOR SWEETMAN.

FOODS AND NUTRITION S-1. (Basic Food Principles, Meal Planning and Service) I.

This course aims to teach the basic scientific principles of food preparation. It includes standards for finished products, conservation of nutritive values, foundation recipes, food materials, recent developments in foods, planning preparation of family meals and meal service. Much emphasis is placed upon organization, high standards of work techniques and final products. All work is based on small quantities.

2 class hours and 1 3-hour laboratory period a week. Credit, 3.
MISS ALICE DAVEY.

FOODS AND NUTRITION S-3. (Elementary Nutrition) I.

This course is designed to give a general survey of the fundamental principles on which the normal person may plan an adequate dietary. It includes a study of the nutritive value of foods so as to make wise selection possible.

3 class hours a week. Credit, 3.
ASSISTANT PROFESSOR COOK.

FOOD SERVICE S-2. II.

Kitchen and restaurant equipment, quantity and formula cooking, steward employee relationship, steward-purveyor relationship. Psychology applied to personnel management, conferences, work supervision, advancement, opportunities. Responsibilities of a steward; health and safety sanitation; labor and food laws.

1 class hour and 1 4-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR KRANZ.

FOOD TECHNOLOGY S-2. (Basic Principles, Freezing, Canning and Pickling) II.

Principles of food preservation including refrigeration and modern locker storage management are covered. Work is given in the use of packaging materials and the examination and grading of food products. Three field trips will be required. Estimated cost \$10.00. This is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
DR. NEBESKY.

FOOD TECHNOLOGY S-5. (Food Manufacturing) I.

Class work consists of study and laboratory exercises on phases of the food industry of major interest to the students. The studies include food preservation methods, manufacture of carbonated beverages, pickled products, confectionery production and commercial bakery procedures and operations. Some field trips to local commercial food plants will be made.

1 class hour and 1 4-hour laboratory period a week. Credit, 3.
ASSOCIATE PROFESSOR LEVINE.

FRUIT GROWING S-11. (Fruits and Fruit Handling) I.

This course is designed primarily for students who are specializing in Food Management. It includes:

1. A study of common varieties of native fruits, citrus fruits, and bananas and the season during which each variety is at its best from the standpoint of the consumer.

2. A consideration of the factors which determine grades of various fruits.

3. A thorough study of storage qualities and methods of storing all fruits commonly used here.

A two-day field trip is a part of the course. Estimated cost, \$10.00.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR ANDERSON.

GENERAL MATHEMATICS S-1. I.

This course provides a thorough drill in those fundamentals which are used in practical arithmetic. Fractions, ratio and proportion, percentage, formulas of area and volume, graphs, logarithms, and the use of the slide rule will be studied.

2 class hours a week. Credit, 2.

HOTEL ACCOUNTS S-2 and S-4. II.

This course is a continuation of Storekeeping S1 with emphasis on book-keeping. This will include study of the uniform system of accounts as recommended by the American Hotel Association; food costs and dining room and restaurant accounts.

1 class hour and 1 2-hour laboratory period a week. Credit, 2.
ASSISTANT PROFESSOR KRANZ.

INTRODUCTION TO STEWARDING S-1. I.

This course includes the following: Kitchen personnel; list of occupational divisions; duties of individuals; receiving, delivery, and shipping departments; food purchasing; markets; bookkeeping and budgeting; cleanliness and sanitation; duties of storekeeper and assistant steward.

1 class hour and 1 2-hour laboratory period a week. Credit, 2.
ASSISTANT PROFESSOR KRANZ.

KITCHEN ADMINISTRATION S-1 and S-3. I.

The course will be a general study of the various problems arising in the operation of a commercial kitchen. Attention will be given to the planning and equipment of kitchens, food control and costs, and personnel problems. Beverages and their service; planning meals and menus. Field trips are made to near-by kitchens.

S-1 — 1 4-hour laboratory period a week.

S-3 — 2 class hours a week.

Credit, 2.

ASSISTANT PROFESSOR KRANZ.

MENU PLANNING S-1 and S-2. I. II.

Various types of menus as used in restaurants and hotels for breakfasts, luncheons, and dinners, and appropriate menus for special functions, are considered. Proper pricing of feature items is stressed.

1 class hour a week.

Credit 1.

ASSISTANT PROFESSOR KRANZ.

POULTRY HUSBANDRY S-9. I.

This course covers candling and grading of eggs, market classification, a study of eggs in the local markets, dressing poultry and various ways of preparing poultry for the table. Prices and market operations form an active part of the course.

A one-half day class trip to the Springfield markets in December is required. Estimated cost, \$2.00.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR VONDELL.

PRACTICAL SCIENCE S-7 and S-8. I. II.

This is a course in applied sciences, chiefly in the fields of chemistry and physics, as they are tools serving the needs of the dairy and food industries. In general, the course is designed to give an introduction to scientific thought and phenomena by means of lectures, textbook study and classroom demonstrations. The emphasis is entirely built around the practical problems in the student's field of work. Practical Science S8 is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR EVERSON.

QUANTITY FOODS S-1, S-2, and S-3. (Preparation and Service) I. II.

This course is planned to give the student an insight into the problems of the kitchen department of the hotel, restaurant or club. Students will be under the supervision of the manager of the Dining Hall and will be apprenticed to the regular employees at the University Dining Hall and will assist the cooks, baker, stock clerk, etc., during the laboratory periods. The course is planned so that each student will have the opportunity to do actual work in quantity food preparation and service.

1 4-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR KRANZ.

SPECIAL LECTURES S-2 and S-4. II.

Registration restricted to Food Management students. These lectures will be presented weekly by men within the hotel and restaurant industry and allied professions and by members of the university faculty. They will cover a variety of subjects all of which will be of interest and value to young people planning to enter the hotel and restaurant business.

1 class hour a week.

Credit, 1.

THE DEPARTMENT.

STOREKEEPING S-1. I.

This course aims to give the student an elementary working knowledge underlying the record system for keeping stocks and inventories. This includes receiving and disbursing stocks and records; also, perpetual inventories and food store management; refrigerator and dry storages.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR KRANZ.

VEGETABLE GROWING S-5. (Marketing Practice) I.

A study of the various factors concerned with the harvesting and marketing of vegetable produce, including grades, packs, packages, brands, market and inspection requirements.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR TUTTLE.

WINES S-1 and S-2. I. II.

Wine and liquor beverages are fully discussed as to use, costs, and service, including both foreign and domestic products. The important development of New York and California as sources of outstanding wines is explained.

S-1 — 1 class hour a week.

Credit, 1.

S-2 — 1 2-hour laboratory period a week.

Credit, 1.

ASSISTANT PROFESSOR KRANZ.

About 129,000 citizens of Massachusetts are engaged directly in agricultural pursuits while a slightly larger number are engaged in "allied industries" which aid the farming industry by obtaining farm supplies and services for production, and then provide the services and facilities for marketing the farm products. This means approximately 100,000 jobs. From 3,000 to 5,000 replacements are required every year to maintain the industry.

APPLIED FORESTRY

PROFESSOR HOLDSWORTH, PROFESSOR TRIPPENSEE, PROFESSOR RHODES,
ASSOCIATE PROFESSOR RICH, ASSISTANT PROFESSOR STICKEL,
MR. MACCONNELL, MR. COLE

The two year course in applied forestry is intended to equip men with a sound understanding of the basic principles of forestry and their vocational application in the field.

The men who elect to take the course should fully understand that the vocation for which they are preparing will involve hard work, much of it physical in character. They should also keep in mind that a man trained in forestry techniques will be in a position to advance through apprenticeship to jobs of genuine responsibility.

There is a definite place in the broad field of forestry for trained workers who are capable of understanding and intelligently carrying out the tasks of a sub-professional character which are so necessary to forest maintenance and development.

Prospective students should have clearly in mind a very definite idea of the occupation they intend to follow upon completion of the course of study described here. Each student should have his own well defined employment goal.

Due to limited quota of fifteen students in each class and a slightly higher requirement in basic mathematics and science preparation, a personal interview is necessary before final acceptance can be given.

Men who successfully complete the curriculum in applied forestry are qualified for places with timber growing and forest products industries, for supervision of forested estates, watershed properties, town forests and for work with certain public agencies which are concerned with forestry.

Facilities: The University owns 800 acres of woodland which is used for the laboratory and field studies of the Stockbridge School. It has ready access to a very considerable additional acreage in the neighborhood of Amherst.

Placement Training: The program of study and training requires the students of Applied Forestry to spend four months in placement training. The placement jobs in forestry often require the student to work at a considerable distance from this region.

Equipment: The Forestry Department has good technical equipment for field study purposes.

Student Limitation: Each entering class is limited to fifteen men.

Student Needs: In addition to the regular expense of the Stockbridge School, the student must be prepared to buy draughting equipment costing about \$30.00, a hand compass costing about \$7.00, and should be able to take several field trips, the cost of which will be about \$50.00.

APPLIED FORESTRY

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Forestry S1 (Wood Identification)
Forestry S5 (Forest Measurement)
Forestry S7 (Forest Physiology)
Review Mathematics S3
Field Exercise (Use and Care of Forest Tools)
Physical Education S1

Second Semester

(Sixteen Weeks Resident Instruction Followed by Four Months Placement Training)
Business English S2
Forestry S2 (Dendrology)
Forestry S4 (Forest Draughtsmanship)
Forestry S6 (Forest Measurement)
Forestry S8 (History of American Forestry; Forest Economics)

Electives

Physical Education S4 (Basketball and Hockey)
Physical Education S6 (Baseball)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Forestry S11 (Silvics)
 Forestry S13 (Harvesting)
 Forestry S15 (Forest Protection)
 Forestry S17 (Library Reading and Reports)
 Horticulture S3
 Physical Education S5 (Required of men students not participating in football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Forestry S10 (Forest Management)
 Forestry S12 (Applied Silviculture)
 Forestry S14 (Forest Products)
 Forestry S16 (Seeding and Planting)
 Forestry S18 (Wildlife Management)
 Forestry S20 (Forest Insects and Diseases)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FORESTRY S-1. (Wood Identification) I.

The gross structural and identification features of our most used North American woods. Laboratory practice in wood identification using macroscopic features.

2 2-hour laboratory periods a week.

Credit, 2.

FORESTRY S-2. (Dendrology) II.

Features of identification, classification and geographical distribution of the principal trees of North America together with a study of the vegetation regions of the United States and Canada.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

FORESTRY S-4. (Forest Draughtsmanship) II.

A course designed to teach the use of draughting equipment for purposes of map, chart and graph making. Instruction in lettering is included.

2 2-hour laboratory periods a week.

Credit, 2.

FORESTRY S-5. (Forest Measurement) I.

Determination of the volume and value of forest growing stock by several approved methods. This involves the making of a chain and compass area survey, type mapping and the use of instruments used in forest estimating and growth studies.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.

FORESTRY S-6. (Forest Measurement) II.

Continuation of and development of S-1.

3 class hours a week (or equivalent field work)

Credit, 3.

FORESTRY S-7. (Forest Physiology) I.

The structure and physiological functions of forest trees and other forest vegetation. A classroom course with demonstrations.

3 class hours a week.

Credit, 3.

FORESTRY S-8. (History of American Forestry; Forest Economics) II.

The story of the development of forestry in the United States; The Economics of Forestry.

2 class hours and 1 seminar hour a week.

Credit, 3.

FORESTRY S-10. (Forest Management) II.

The management of American forests; the preparation of operational management plans. Class and field work.

2 class hours and 1 4-hour field period a week.

Credit, 4.

FORESTRY S-11. (Silvics) I.

The forest qualities and requirements of forest trees, including a study of tree-growing site relationships, growth rates, tolerance, temperature, and moisture factors. Special emphasis is laid on the experience of others in the forest use of certain tree species.

3 class hours a week.

Credit, 3.

FORESTRY S-12. (Applied Silviculture) II.

This course considers the several forest reproduction methods, the intermediate cuttings, together with extensive field practice in their application.

1 8-hour field period a week.

Credit, 4.

FORESTRY S-13. (Harvesting) I.

The methods of harvesting forest products with special emphasis on means used in New England. A general survey of methods used in all of the forest regions of the United States.

2 class hours and 1 4-hour laboratory field period a week. Credit, 3.

FORESTRY S-14. (Forest Products) II.

The properties of American woods. The products of the forest industries.

3 class hours a week. Credit, 3.

FORESTRY S-15. (Forest Protection) I.

Methods of protecting the forest against fire and other forest-destructive agencies.

3 class hours a week. Field trips by arrangement. Credit, 3.

FORESTRY S-16. (Seeding and Planting) II.

This course considers the production of forest planting stock in nursery; the characteristics and quality of forest tree seed; artificial reforestation.

1 class hour and 2 2-hour field and laboratory periods a week. Credit, 3.

FORESTRY S-17. (Library Reading and Reports) I.

Library reading and study on assigned forestry subjects. Designed to develop the ability to analyze forestry material and to abstract it clearly and concisely.

2 hours general seminar. Individual Conferences. Credit, 3.

FORESTRY S-18. (Wildlife Management) II.

Effects of animals on the forest; and the effects of forest practices on wild animal production.

3 class hours a week. Credit, 3.

FORESTRY S-20. (Forest Insects and Diseases) II.

A study of the characteristics of the principal forest insects and diseases and the nature of the damage they inflict or the good that they do in the forest.

3 class hours a week. Credit, 3.

REVIEW MATHEMATICS S-3. I.

A course intending to bring into sharp focus the simple mathematics which is used in vocational forestry and without which such forestry cannot be intelligently practiced. Arithmetic, plane geometry and certain vocational uses of trigonometry are taught.

3 Class hours a week. Credit, 3.

Field Exercise. (Use and Care of Forest Tools)

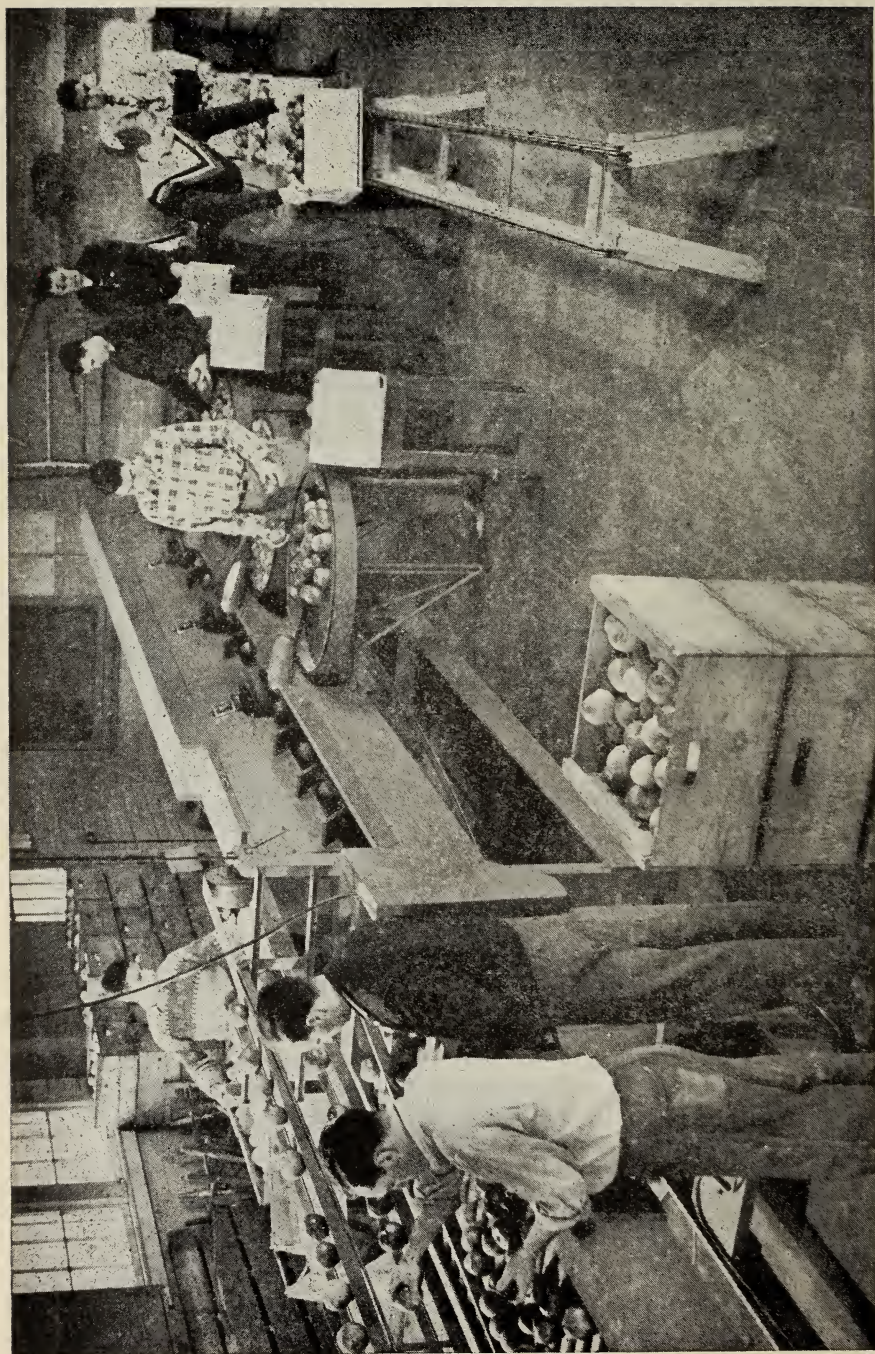
Demonstration and practice in the use and care of the common hand and machine tools used in forest work. Particular emphasis is placed on the efficient use of tools and the safety factors in their handling.

Required of first year students. Hours by arrangement. No credit.

Although Massachusetts is predominately an urban-industrial state with 90 percent of its people living in towns and cities, agriculture is one of the top three industries of the State.

Ninety-five percent of Massachusetts' land area is open rural countryside. Ten percent of our population (about 430,000) live comfortably in these areas. About one-third of these rural folks (141,000) live on the 30,000 farms and depend upon agricultural production as the principal source of income.

The Massachusetts farm industry represents an investment in land, buildings, equipment and live stock of over 300 million dollars. Its gross income for 1950 was approximately 175 million dollars.



GRADING APPLES

FRUIT GROWING

PROFESSOR FRENCH, ASSOCIATE PROFESSOR ROBERTS, ASSISTANT PROFESSOR
ANDERSON, MR. JAMES ANDERSON

The course in Fruit Growing prepares the student for successful participation in the activities of our many sided fruit industry. An essentially practical course, it emphasizes also the basic principles of plant growth which underlie sound cultural practices and the economic principles which bear upon marketing procedures and the business side of fruit growing. It provides a foundation on which increasing effectiveness may be developed through continued practical experience.

The University has about fifty acres of fruits easily reached from the classroom, which are used freely for purposes of illustration and study. Most of the tree and small fruits commonly found in New England are grown here on a commercial scale. Many experiments and tests are in progress in the plantations, offering exceptional opportunities to the student for the practical study of plant reactions under many and varied conditions. Excellent commercial orchards near the campus provide a wealth of additional material for observation and study. Large markets are visited to afford valuable contacts with the main channels of crop distribution.

Equipment for instruction includes a modern storage and packing house in which there are several types of refrigerated and common storage, a quick freezing unit, and zero temperature holding rooms. The principal types of orchard tools and machines, such as tractors, plows, harrows, cultivators, sprayers, dusters, and pruning and grafting tools are available for study and trial by students. Emphasis is placed on life histories and methods of control of all important insect, fungus and other pests. Materials used in pest control are also studied.

Graduates of the course in Fruit Growing are found in positions of responsibility all over the Northeast. Some have established successful fruit farms of their own. Others, after gaining added practical experience, have risen to positions as managers or foremen in large orchards. Still others have entered the industrial field and are employed by supply and equipment firms or are engaged in marketing activities. Fruit Growing is an active and thriving industry which offers a field of continuing interest and many opportunities for profitable development to the earnest student.

Trains For Jobs Like These:

Skilled workers on fruit farms, operators, foremen, owners; packing house operators, managers of sales and distribution. Salesmen for commercial spray materials, orchard equipment, and fertilizers; fruit inspection and grading. Growers of specialty fruit crops.

Field trips will be required during the two years at an estimated cost of \$25 per student.

Fruit Growing

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Engineering S1 (Farm Power)
Agronomy S1 (Soil Management)
Botany S1 (Tree Physiology)
Fruit Growing S1 (Growing Tree Fruits)
Public Speaking S1
Vegetable Growing S1 (Principles of Vegetable Culture)
Physical Education S1 is required of men students not participating in football; also required of women students)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agricultural Engineering S14 (Repair of Farm Equipment)
Agronomy S2 (Fertilizers)
Fruit Growing S2 (Orchard Pruning)
Fruit Growing S12 (Orchard Pests)
Public Speaking S2
Poultry Husbandry S10 (General Poultry Husbandry)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S1 (Farm Economic Problems)
 Agricultural Engineering S9 (Drainage and Farm Structures)
 Beekeeping S1 (Fall Management, Wintering, Honey, and Bee Diseases)
 Business English S1
 Forestry S3 (Woodland Management)
 Fruit Growing S5 (Harvesting, Packing, Storage and Marketing)
 Vegetable Growing S7 (Commercial Vegetable Culture)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Beekeeping S2 (Spring Management, Pollination and Honey Production)
 Farm Management S2 (Farm Management and Accounts)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Fruit Growing S6 (Advanced Fruit Growing)
 Fruit Growing S8 (Small Fruits)
 Vegetable Growing S6 (Marketing Methods)
 Vegetable Growing S8 (Commercial Vegetable Culture)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FRUIT GROWING S-1. (Growing Tree Fruits) I.

This course covers the planting and development of orchards and the management of bearing trees. The nature of the tree itself is stressed as the basis of sound cultural practices. The selection of sites and soils and varieties is studied for plantations of apples, pears, peaches, plums, and cherries. The handling of young trees to bring them into early profitable bearing is given special attention.

The culture of bearing orchards is studied in detail to give an understanding of the factors that influence yield and quality of fruit. Methods of soil management are considered with reference to their long-time effects on tree and soil. The experimental plots afford exceptional opportunities to study cultural methods and many subjects are discussed in the orchards.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

PROFESSOR FRENCH AND MR. JAMES ANDERSON.

FRUIT GROWING S-2. (Orchard Pruning) II.

This course aims to give the student a thorough training in the underlying principles and the practice of pruning apples, pears, peaches, cherries and plums. The bearing habit of each fruit is studied as a basis for effective pruning. Practice pruning in the University orchards is stressed as an important feature of the course. Instruction and practice in budding and grafting are included in this course. Bridge grafting and top working are given special attention.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.

ASSOCIATE PROFESSOR ROBERTS AND MR. JAMES ANDERSON.

FRUIT GROWING S-4. (Fruit Pests and Spraying) II.

This course deals with the characteristics and behavior of insect and disease pests which attack fruit plants. Particular attention is given to the vulnerable points in their life cycles at which control measures are directed. A study of the principal spray materials and their uses is an essential part of the course.

The construction and care of spraying and dusting equipment is emphasized and students are required to use various types of implements in spraying and dusting trees in the orchard.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-5 (Harvesting, Packing, Storage, and Marketing) I.

Handling the crop from tree to consumer is the field covered by this course. Methods of harvesting and appliances used are studied in the orchards. Practice in packing the most popular containers forms a prominent part of the laboratory work.

The principles of common and refrigerated storage are considered in detail and storage house construction is discussed with a critical examination of several storages in use on or near the campus. Marketing methods

as they relate both to distant and to local markets are given special consideration. A two-day field trip is a part of the course. Estimated cost, \$10.00.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-6. (Advanced Fruit Growing) II.

This course involves a critical study of tree behavior as a basis for orchard management. Information acquired in other courses and in placement training is brought to bear on important orchard problems. It is the aim of the course to familiarize the student with conditions under which fruit must be grown here, with current thought on the more recent developments, and with adjustments which are being made in the fruit industry of the Northeastern States.

Each student must be prepared to take one or more trips to prominent orchards or to leading fruit sections of the Northeast. Estimated cost, \$15.00.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-7. (Small Fruits) I.

This course is similar to Fruit S-8, but is given for students majoring in fields other than Fruit Growing.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR ANDERSON.

FRUIT GROWING S-8. (Small Fruits) II. (For Fruit Majors Only)

There are many unusual opportunities in Massachusetts for success in growing small fruits. This course deals with the establishment and management of plantations of strawberries, raspberries, blackberries, blueberries, currants, cranberries, and grapes. The aim is to make the course of the utmost practical value as well as to give an understanding of the fundamental principles on which practices are based.

The University has plantations of these fruits except cranberries which are used freely for laboratory purposes. Berries which ripen in summer are frozen and held in excellent condition for study in this course.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR ANDERSON.

FRUIT GROWING S-9. (General Course) I.

This course is intended to meet the needs of students in other majors who can devote one semester only to the subject of Fruit Growing. It deals with the practical side of growing tree and small fruits for home use and market. Special attention is given to such questions as selection of sites, choice of varieties, grafting, pruning, spraying, soil management, harvesting, and storing. (Horticulture and Poultry majors.)

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JAMES ANDERSON.

FRUIT GROWING S-10. (General Course) II.

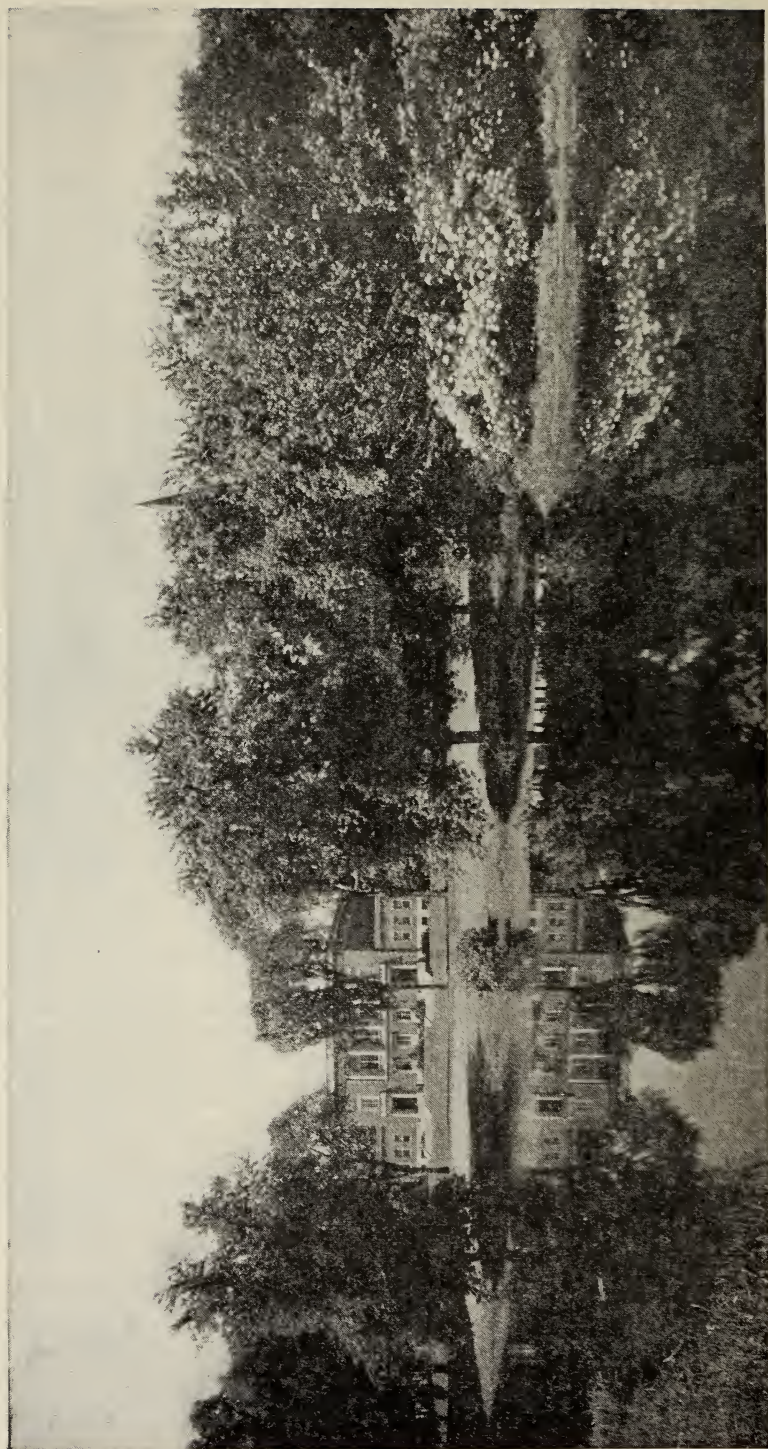
This course is a repetition of Fruit Growing S-9 primarily for the benefit of first year students who are specializing in Animal Husbandry.

4 class hours and 1 2-hour laboratory period a week. Credit, 5.
MR. JAMES ANDERSON.

FRUIT GROWING S-12. (Orchard Pests) II. (For Fruit Majors only)

An introductory course designed to acquaint fruit major students with the principal orchard insects and diseases which may be encountered during placement training. Control measures for these pests are also briefly considered.

2 class hours a week. Credit 2.
ASSISTANT PROFESSOR ANDERSON.



ORNAMENTAL HORTICULTURE

ORNAMENTAL HORTICULTURE

PROFESSOR BLUNDELL, MR. PROCOPIO, MR. HAMILTON

The constantly increasing interest in development of grounds, both public and private, for use and enjoyment, has created a demand for men trained to handle the varied problems in the construction and maintenance of these grounds. The course in Ornamental Horticulture aims to make the student familiar with these various problems.

Men who have taken this course are to be found in such different jobs as foremen in nurseries, or proprietors of nurseries which they themselves have developed; superintendents on private estates, cemeteries, parks, and various public and private institution grounds; foremen for landscape construction firms, and some have organized their own business in landscape construction and grounds maintenance service.

With the whole campus as a laboratory, the student every day finds problems about him comparable to those he will meet when he goes out to work. The broad lawns, the walks and drives, the gardens, the greenhouses, the orchards, the vegetable plots, as well as the farms, supply all the various phases of work which will be encountered on estates, in parks, or in institution grounds. As far as practicable the student is given the opportunity to determine what these problems are and to solve them himself under expert supervision.

On the campus is to be found a large and excellent collection of mature trees, shrubs, and vines. From these plants the student is able to build up a background of plant knowledge; in identification; in propagation which is carried on in a special greenhouse for the purpose; in the handling of plants in various stages of their growth, in the nursery and on the campus; and in their ultimate care, pruning and protection against injuries of all kinds. Construction of roads, walks, drainage and other problems involving the moving of earth are especially valuable to those looking forward to landscape construction.

Trains For Jobs Like These:

Skilled workers in plant nurseries; gardeners, foremen or superintendents on private estates, public parks, cemeteries, and various public and private institution grounds such as state and government cantonments and hospitals, colleges and private schools; workers or foremen with landscape construction companies, real estate developments; owners and operators of small landscape maintenance businesses and nurseries, salesmen for seed and nursery concerns, plant propagators, town or city watershed foresters, botanic garden foremen.

A special requirement for students in Ornamental Horticulture is one draftsman's set estimated at \$25 and secured at the University store.

Field trips will be required during the two years at an estimated cost of \$20 per student.

Ornamental Horticulture

First Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Agronomy S5 (Construction and Maintenance of Fine Turf Areas)
 Floriculture S1 (Garden Materials)
 Horticulture S1 (Plant Materials)
 Public Speaking S1
 Vegetable Growing S1 (Principle of Vegetable Culture)
 Physical Education S1 (Required of men students not participating in football; also required of women students)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agronomy S2 (Fertilizers)
 Botany S2 (Diseases of Trees and Shrubs)
 Entomology S2 (Insect Pests of Ornamental Trees, Shrubs, and Flowers)
 Horticulture S2 (Plant Propagation)
 Public Speaking S2
 Vegetable Growing S2 (Principles of Vegetable Culture)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S1 (Practices and Policies—Lectures only)
 Business English S1
 Entomology S5 (Shade Tree, Shrub, and Ornamental Plant Insects)
 Floriculture S3 (Greenhouse Management)
 Forestry S3 (Woodland Management)
 Fruit Growing S9 (General Course)
 Horticulture S3 (Surveying and Mapping)
 Physical Education S5 (Required of men students not participating in football; also required of women students)

Second Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S2 (Practices and Policies—Lectures only)
 Floriculture S8 (The Uses of Herbaceous Plants)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Horticulture S4 (Landscape Construction Problems)
 Horticulture S6 (Plant Materials)
 Horticulture S8 (Grounds Maintenance)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

HORTICULTURE S-1. (Plant Materials) I.

Study of evergreen and deciduous trees used in landscape work, their distinguishing characters, and culture, with special reference to nursery and planting practice.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
 PROFESSOR BLUNDELL.

HORTICULTURE S-2. (Plant Propagation) II.

This course will present the principles of plant propagation with special reference to their application to plant materials in nursery and greenhouse practice. The lectures are concerned with careful explanation of seedage, cuttage, graftage, layerage and division. In the laboratory the student propagates plants by each of these methods.

2 class hours and 2 2-hour laboratory periods a week. Credit, 4.
 MR. PROCOPIO.

HORTICULTURE S-3. (Surveying and Mapping) I.

Practice in the use of simple surveying instruments as tapes, compasses and levels used in the measurement of land surfaces, and the application of these instruments in landscape construction.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
 MR. HAMILTON.

HORTICULTURE S-4. (Landscape Construction Problems) II.

Continuation of Horticulture S-3, including the reading of landscape plans, figuring construction cost on grading work and garden construction problems, and setting stakes for landscape development from working drawings.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
 MR. HAMILTON.

HORTICULTURE S-6. (Plant Materials) II.

Study of shrubs, both evergreen and deciduous, woody vines, to enable the student to recognize the plants used in ornamental plantings and to familiarize him with the handling of these plants both in nursery practice and landscape work. A two-day field trip will be required. Estimated cost, \$10.00.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
 PROFESSOR BLUNDELL.

HORTICULTURE S-7. (Grounds Maintenance) I.

A course based upon the formulation and study of a work program which considers those essential operations contributing to successful horticultural management of grounds. The care of woody ornamental plants is included under the following heads: planting, pruning, maintenance of soil fertility, winter protection, and pest control. For non-majors only.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
 MR. PROCOPIO.

HORTICULTURE S-8. (Grounds Maintenance) II.

For Ornamental Horticulture majors only. This course deals with the planting and maintenance of gardens and plantations. Laboratory work takes up spring practices in grounds maintenance and emphasizes the development of supervisory capacity. A one day field trip to Education Day of the Annual Convention of the New England Nurserymen's Association will be required. Estimated cost: \$5.00.

3 class hours a week, first half of semester.

1 class hour and 1 4-hour laboratory period last half of semester.

Credit, 3.

MR. PROCPIO.

AGRICULTURAL ENGINEERING HELPS TO DEVELOP BETTER FARMING

Since the standard of living of the farm family is determined to a large extent by the size of the farm business, today's farmers are using the results of engineering applied to agriculture to realize a better living. Field operations have been mechanized and better labor efficiency obtained through the application of power and machinery. Proper planning of buildings provides efficiency, economy, and improvement in the appearance of the farmstead. It simplifies the work, and takes advantage of electrically operated machines which do the drudge labor. Proper structural designs provide animal comfort which contribute to higher production, and strengthen the building against the stresses from hurricanes and heavy snows. The use of heat, refrigeration, air cooling, and ventilation all have a part in the conditioning of food and crop storages and animal shelters. Drainage and erosion control devices and irrigation equipment help maintain the productivity of the soil and improve the crops. All of these are production equipment for a great industry—Agriculture. Agricultural Engineering helps develop them, and apply them to the individual enterprise.

TURF MAINTENANCE

ASSOCIATE PROFESSOR DICKINSON, MR. CORNISH

There is an immediate need for skilled supervisors and assistants to park, cemetery, and recreation area superintendents. Municipal and private golf clubs are expecting that their superintendents shall be trained in turf maintenance. Every city and large town offers splendid opportunities for the private business horticulturist who is especially well trained to "take care of the lawn."

As the many proposed memorial parks, play fields, public buildings and golf courses are being constructed and completed, the demand for specialists in turf maintenance will be increased and the number of replacements needed annually will be large.

This course is arranged and taught in such a manner that a student who has completed the work will be well qualified to accept a position as assistant or the actual superintendency of a small park, cemetery, or golf course, or to establish a business in his community.

Laboratory and field exercises give practical experience and demonstrations. Good equipment is supplemented by loans from manufacturers and supply houses. The supporting courses are strong and have been carefully chosen for their close alliance to the problems of turf maintenance and general estate work.

Each student's placement training and special interest will be considered in his chosen field, whether it be park, cemetery, golf course, or private business, and professional men will visit the classes to give of their experiences. Every student will be required to keep a record of work done, results obtained, and observations made during the placement training period, for use during the senior year.

Positions Capable of Holding at Graduation:

Assistant to superintendents or as an actual superintendent on golf course, cemetery, a park, or with a commercial nursery or landscape service company, also with golf course construction companies and equipment supply dealers.

At least one field trip will be required during the second semester of the senior year. The total cost of such a trip or trips to each student will not exceed \$20.00.

Turf Maintenance

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Agrostology S1
Agrostology S3 (Uses and Requirements of Turf Areas)
Floriculture S1 (Garden Materials)
Horticulture S1 (Plant Materials)
Public Speaking S1
Physical Education S1 (Required of men students not participating in football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agronomy S2 (Fertilizers)
Agrostology S2 (Construction of Turf Areas)
Agrostology S4 (Maintenance of Turf Areas)
Entomology S6 (Turf Insects)
Horticulture S2 (Plant Propagation)
Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Engineering S3 (Farm Shop)
Agronomy S7 (Soil-Plant Relationships)
Agrostology S5 (Application of First Year Courses)
Agrostology S7 (Disease Controls)
Arboriculture S1 (Lectures)
Business English S1
Horticulture S3 (Surveying and Mapping)
Horticulture S7 (Grounds Maintenance)
Physical Education S5 (Required of men students not participating in football)

Second Semester

(Sixteen Weeks Resident Instruction)
Agricultural Engineering S2 (Farm Power)
Agrostology S6 (Turf Maintenance as a Business)
Agrostology S8 (Layout and Construction of Turf Areas)
Arboriculture S2 (Lectures)
Floriculture S8 (The Uses of Herbaceous Plants)
Horticulture S4 (Landscape Construction Problems)

Electives

Physical Education S4 (Basketball and Hockey)
Physical Education S6 (Baseball)

AGROSTOLOGY S-1. I

This course provides a background for the succeeding courses. The numerous aspects that enter into professional turf growing are introduced and correlated with each other and the actual growing of grass.

3 class hours a week.

Credit, 3.

ASSOCIATE PROFESSOR DICKINSON.

AGROSTOLOGY S-2. (Construction of Turf Areas) II.

Construction of turf areas. Influence of foundation, subsoil, and topsoil zones. Talks preliminary to placement training. Adaptation of Agronomy S-1.

3 class hours a week.

Credit, 3.

ASSOCIATE PROFESSOR DICKINSON.

AGROSTOLOGY S-3. (Uses and Requirements of Turf Areas) I.

Uses and requirements of turf areas. Grass seed and plant characteristics, identification and adaptation. Germination of seeds and growing of plants.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. CORNISH.

AGROSTOLOGY S-4. (Maintenance of Turf Areas) II.

Maintenance of turf areas. Fertilizing, weeds, clipping and watering, with practical work and problems. Adaptation of Agronomy S-2.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. CORNISH.

AGROSTOLOGY S-5. (Application of First Year Courses) I.

Thorough resume of the summer work by students, discussing labor, operations, equipment, and results. Application of first year courses. Diagnosis of turf troubles.

3 class hours a week.

Credit, 3.

ASSOCIATE PROFESSOR DICKINSON.

AGROSTOLOGY S-6. (Turf Maintenance as a Business) II.

Turf maintenance as a business. Costs, purchasing and reports.

3 class hours a week.

Credit, 3.

ASSOCIATE PROFESSOR DICKINSON.

AGROSTOLOGY S-7. (Water Systems and Disease Controls) I.

Part I. — Layout and construction of golf course water system.

Part II. — Diseases, weeds, and insect pests, with their controls.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. CORNISH.

AGROSTOLOGY S-8. (Layout and Construction of Turf Areas) II.

Construction of recreational areas, athletic field, airports, and cemeteries is studied in detail from the turf viewpoint. The design of golf courses is introduced. Contracting law and financing of turf construction contracts are discussed.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. CORNISH.

RELATED SUBJECTS IN OTHER DEPARTMENTS

AGRICULTURAL ECONOMICS S-1. (Farm Economic Problems) I.

The purpose of this course is to introduce students to the more important economic problems facing New England farmers. Increasing competition with other farm sections, long-time movements of farm prices and farm profits, farm credit, farm taxation; tariffs and other farm relief measures are some of the problems to be considered.

2 class hours a week.

Credit, 2.

MR. CALLAHAN.

AGRICULTURAL ECONOMICS S-2 and S-3. (Marketing) I. II.

This course deals largely with economic problems arising out of marketing farm products. Particular attention is given to marketing methods used in New England and to the comparison of local methods with methods used by farmers in competing sections. Principles and methods of co-operative marketing used by successful co-operative associations are studied in detail in order to show how New England farmers may meet competition from associations in other sections, either as individual producers or as officers or members of local associations.

2 class hours a week.

Credit, 2.

MR. CALLAHAN.

AGRICULTURAL ECONOMICS S-5. (Dairy Business Accounting) I.

Business arithmetic and bookkeeping are given consideration. The mathematics of fat determination, ice cream mixes, etc., are studied. An understanding of elementary bookkeeping principles involved in milk distribution also forms a part of the course.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

THE DEPARTMENT.

AGRICULTURAL ENGINEERING S-1 and S-2. (Farm Power) I. II.

A study of the principles of the gasoline engine and its accessories, as used in trucks, tractors and power units; and the application of electricity to farm operations, with particular emphasis on the selection, care and maintenance of electric motors. Exercises cover trouble shooting and minor repairs to gasoline engines; and the selection of proper wire size, overload protection, and the electrical equipment for farm electric applications.

3 2-hour laboratory periods a week.

Credit, 3.

PROFESSOR STAPLETON AND ASSISTANT PROFESSOR TAGUE.

AGRICULTURAL ENGINEERING S-3 and S-4. (Farm Shop) I. II.

The purpose of this course is to teach the student the manner in which adequate tools in a farm shop can assist in solving farm construction and maintenance problems. Instruction is given in the care and use of carpenter's tools through exercises in bench work, repair of farm equipment, and building construction, including the mixing and placing of concrete. Exercises covering domestic water systems and the repair of farm machinery give the student experience in arc and gas welding, pipe fitting, soldering, and the use of machinist's tools. While the time is too limited for the student to develop much skill, the capabilities of the equipment can be adequately demonstrated.

3 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR PUSHEE AND MR. PATTERSON.

AGRICULTURAL ENGINEERING S-6. (Dairy Mechanics) II.

Designed for men who are fitting themselves for work in dairy plants and allied work, this course covers the principles and equipment involved in processing and refrigeration of milk products, together with the instrumentation necessary for process control.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR PFLUG.

AGRICULTURAL ENGINEERING S-7 and S-8. (Farm Structures) I. II.

A study of principles of design of farm buildings, utilizing elementary structural mechanics and the characteristics of building materials. Experience in developing construction details results from the complete planning of a major farm building by the individual student.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
PROFESSOR STAPLETON.

AGRICULTURAL ENGINEERING S-9 and S-10. (Farm Structures and Drainage) I. II.

A study of building materials, details of construction, simple structural mechanics, and the principles of design applied to farm buildings. Each student will design in detail one of the major farm buildings in which he is particularly interested.

About one-fourth of the time is given to the study of land drainage practice and the use of the engineer's level in laying out drainage systems.

1 class hour and 3 2-hour laboratory periods a week. Credit, 4.
ASSOCIATE PROFESSOR MARKUSON.

AGRICULTURAL ENGINEERING S-14. (Repair of Farm Equipment) II.

Instruction in the capabilities of arc and gas welding, soldering, pipe fitting, and machinist's tools in the repair and construction of farm machinery and miscellaneous farm equipment. Exercises cover the repair of machines and the study of pumps and water systems.

3 2-hour laboratory periods a week. Credit, 3.
MR. PATTERSON.

AGRONOMY S-1. (Soil Management) I.

Every agricultural interest is vitally concerned with the soil, its adaptations and its management for plant production. This course treats of the selection of suitable soils for the special purpose of agriculture, horticulture and floriculture.

Laboratory includes training in the use and interpretation of the maps of the U. S. Soil Survey and in tests of soil texture, organic matter and soil acidity. Practical field work will be given in judging the crop adaptation and value of soils.

As a field project the student will be required to make a study of some farm, nursery or florist's plant, from the standpoint of soil conditions and methods of soil management in relation to the enterprise as a whole.

2 class hours and 1 3-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR THAYER, MR. ZAK
AND TEACHING FELLOWS.

AGRONOMY S-2. (Fertilizers) II.

This course deals with the origin, manufacture, purchase and use of commercial fertilizer materials. A study will be made of the interpretation of fertilizer formula, analysis and guarantee. Special attention will be given to the newer concentrated fertilizer materials and to those produced from atmospheric nitrogen. The laboratory work will give practice in the identification of fertilizer materials, in the calculation of fertilizer formulas, and in the preparation of fertilizer mixtures.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR THAYER, MR. ZAK
AND TEACHING FELLOWS.

AGRONOMY S-4. (Field Crops) II.

The lecture hours of this course will be devoted to presentation and discussion of the most successful methods of fertilizing, cultivating, harvesting, and storing the field crops grown in New England. Special attention will be given to the choice of the best adapted varieties for the production of hay, pasture, corn, potatoes, and root crops.

The laboratory work will include the study of corn and potato varieties, identification of grass and weed species, and studies of purity and germination. Field observations of growing crops will be included as the season permits.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. PARSONS.

AGRONOMY S-5. (Construction and Maintenance of Fine Turf Areas) I.

At the completion of this course the student should have a knowledge and appreciation of the requirements for the growing of lawns and sports turf.

He will have considered the construction of turf areas; seed identification, selection and sowing; the identification of turf grasses and their soil and fertilizer preferences, correct cultural practices, turf diseases and pests and their control.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.
MR. CORNISH.

AGRONOMY S-7. (Soil-Plant Relationship) I.

Elementary soil chemistry and soil physics are related to fundamental plant physiological processes. The absorption, utilization, and functions of nutrient elements by plants are related to their occurrence, chemical changes, and supply in soils.

2 class hours a week. Credit, 2.
PROFESSOR COLBY.

BACTERIOLOGY S-1. (Bacteriology and Rural Hygiene) I.

The reproduction, structure, growth, changes produced by the action of bacteria upon various substances and the methods by which disease producing bacteria of man and animals are disseminated will be studied. The proper use of disinfectants, vaccines and serums in the control and treatment of disease will be discussed. The purpose of the course is to present the problems of applied bacteriology in health, agriculture and industry. The sanitary production, handling and distribution of milk involving human and environmental contacts with a food often consumed raw is an important problem to be controlled by responsible citizens of the community. Discussions on milk include the various sources of milk infections, methods of controlling sanitary production and marketing and the detection and elimination of milk dangerous to the public health.

Water supplies are of especial importance to man. The construction of wells, cisterns, etc., will be briefly considered and the application of sanitary measures to prevent and control their pollution will be discussed. The proper treatment and disposal of private and municipal sewage presents a problem of no small importance. Work has been planned in this course to present some of the problems pertaining to the sanitary production and distribution of foods.

This course is designed to acquaint the student with the nature and importance of micro-organisms and thus better explain biological changes in nature and susceptibility to disease. (Animal Husbandry, Poultry Husbandry, and Dairy Industry majors.)

3 class hours a week. Credit, 3.
MR. LARKIN.

BACTERIOLOGY S-4. (Dairy Bacteriology) II.

Bacteria and other micro-organisms are the responsible agents for changes which occur in milk, and for the contagion which sometimes causes diseases. They are found in milk at times when leaving the udder. They get in with the dust and dirt while milking and they adhere to the dairy utensils which carry them over from one milking to the next. From cow to the consumer there is the constant presence of these micro-organisms to contend with, on the one hand, and to foster on the other.

Many of these changes occurring in milk are undesirable, such as ropy milk, sour milk, bitter milk, tainted milk, etc. Many of these changes are encouraged as the ripening of cream for butter, of milk for cheese, of milk for milk drinks. The former are fought, the latter fostered.

Micro-organisms of typhoid fever, scarlet fever, diphtheria and other diseases find their way by means of milk to the consumer and produce epidemic forms of these diseases.

Various bacteriological tests for the estimation of the numbers and types of organisms in milk are studied. Special attention is given to the interpretation of results indicated by the standard plate, Breed, methylene blue, and Burri methods of testing milk quality. Laboratory procedures for the determination of special groups of bacteria not normally found in milk, such as fecal contaminants and heat resistant organisms, are discussed. The proper use of these methods will quickly enable one to locate the source of trouble and check any further continuance.

It is evident, therefore, that to handle milk and milk products safely it is desirable to know something of the agents which are the source of so much attention in the dairy. This indicates the nature of this course, which is required of all students who elect dairying as one of their special lines of work.

1 class hour and 2 4-hour laboratory periods a week.

Credit, 5.
MR. LARKIN.

BEEKEEPING S-1. (Fall Management, Wintering, Honey, and Bee Diseases) I.

The students are given an opportunity for individual handling of bees in the early fall, and field studies are made of the bee colony and its organization. Studies and practice in fall management are followed by a similar treatment of winter protection and the bees are then prepared for winter. During the latter part of the semester the surplus honey is extracted and prepared for market, a laboratory study made of the product and, finally, the commoner bee diseases are discussed and methods of control pointed out.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.
ASSISTANT PROFESSOR SHAW.

BEEKEEPING S-2. (Spring Management, Pollination, and Honey Production) II.

The first part of the semester is occupied in assembling and studying the equipment used in beekeeping, but as soon as the weather permits, work is resumed on the bees in the apiary. Studies are made in spring management; pollination in the apple orchards is particularly stressed, and attention is then turned to the preparation of the colonies for honey production.

Throughout the entire course, wherever possible, the work is made practical and individual, enough theory being given so that the student will understand the reasons for his manipulations.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.
ASSISTANT PROFESSOR SHAW.

BOTANY S-1. (Tree Physiology) I.

A study of the processes occurring in trees and their relation to the complex of activities constituting plant growth. Topics include basic considerations of anatomy and physiology of roots, stems and leaves. Absorption, transpiration, internal water relations, food synthesis, digestion, translocation and growth receive appropriate elementary treatment.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.
PROFESSOR KOZLOWSKI.

BOTANY S-2. (Diseases of Trees and Shrubs) II.

A survey course dealing with the cause, nature, and general procedures of plant disease control. The profound influence environment exerts on plant disease, the role played by insects in their transmission and the major classes of plant pathogens, fungi, viruses and bacteria are briefly considered.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR BANFIELD.

BUSINESS ENGLISH S-1 and S-2. I. II.

This course is designed to cover review work in the fundamentals of grammar and composition, and to give students training and practice in writing various types of business letters and reports.

3 class hours a week.

Credit, 3.

MRS. WRIGHT.

BUSINESS MANAGEMENT S-1. I.

This course is designed primarily for students majoring in Floriculture. It involves a study of records and accounts used by florists; costs and prices; uses of capital and credit; house and store management; advertising; buying and selling; economic use of labor and equipment; general business trends as affecting the flower business; how the florist should make adjustments to meet economic changes; analyses of going concerns; and finally a bringing together of all information studied and applying it to the successful organization of a business. The entire course is to be made as applicable and practical as possible.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

PROFESSOR LINDSEY.

BUSINESS MANAGEMENT S-3. I.

This course is designed primarily for students majoring in Dairy Industry. The principles of business organization and management are considered in relation to the successful operation of a dairy plant. The course includes a study of the following: various records and accounts used by dairies; costs and prices; uses of capital and credit; economic trends as affecting the business; how to make adjustments in the business to meet economic changes; analyses of different types of going concerns; and finally a bringing together of all the information studied and applying it to the successful organization of a business.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

PROFESSOR LINDSEY.

ENTOMOLOGY S-2. (Insect Pests of Trees, Shrubs, and Greenhouse Plants) II.

A course designed to acquaint the student with the major insect pests of the plants mentioned. The class will be divided into two sections. Section I will include the Arboriculture and Horticulture majors, with study devoted to an understanding of the structure, classification, and development of the pests as an introduction to Entomology S-5. A summer collection of important pests will be required. Section II will consist of the Floriculture majors, with study devoted to identification, development, and control of greenhouse insect pests.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

MR. WEIDHAAS.

ENTOMOLOGY S-5. (Shade Tree, Shrub, and Ornamental Plant Insects) I.

A course designed for the recognition of insect pests of ornamental plants, and for the study of life histories, environmental relations, and control measures of these pests. Collections made during the summer will be the basis of recognition study as well as departmental specimens.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. WEIDHAAS.

ENTOMOLOGY S-6. (Turf Insects) II.

A course designed to acquaint the student with the principal pests of turf. General introduction to Entomology, followed by study of specific pests of turf.

1 class hour and 1 2-hour laboratory period.

Credit, 2.

ASSISTANT PROFESSOR HANSON.

FARM MANAGEMENT S-1 and S-2. (Farm Management and Accounts) I. II.

The work in this course involves a study of farm records and accounts; costs and prices of farm products; uses of capital and credit; types of farming, selection of crop and live stock enterprises; size, diversity and production as related to the successful farm business; farm layout and arrangement; economic use of labor, power and equipment; detailed analysis of both successful and unsuccessful farms, how the farmer should make adjustments to meet economic changes; and finally, a bringing together of the information gained and applying it to the successful organization of a farm business.

Actual farm records are used to illustrate the above points. The entire course is made as applicable and practical as possible.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

PROFESSOR BARRETT.

Note. — Farm Management will be given both semesters. The first semester will be for students majoring in Animal Husbandry; the second semester for students majoring in Poultry Husbandry, Fruit Growing and Vegetable Growing.

FARM MANAGEMENT S-3. (Efficiency in Farming Operations) I.

For Freshmen. This is an introductory course to the regular Farm Management work which comes in the second year. It is in no sense a theoretical consideration but rather a study of the practical aspects of the efficiency of the many day-to-day jobs found on various types of farms. In brief, a careful analysis is made of the "one best way" of doing the jobs. The course involves a study of farm layout, building layout, economical use of machinery and equipment, and efficiency in hand operations. The primary objective is to point out ways of reducing farm labor costs. Motion pictures will be used to illustrate good methods versus poor or inefficient methods.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

PROFESSOR BARRETT.

FOOD TECHNOLOGY S-2. (Basic Principles, Freezing, Canning and Pickling) II.

Principles of food preservation including refrigeration and modern locker storage management are covered. Work is given in the use of packaging materials and the examination and grading of food products. Three field trips will be required. Estimated cost \$10.00.

Note: This is a full semester course for Freshman Food Management and Senior Vegetable Growing majors; one-half semester course for Freshman Dairy Industry majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

DR. NEBESKY.

FOOD TECHNOLOGY S-4. (Special Products) II.

The class and laboratory exercises in this course are planned to meet the needs of students majoring in Dairy Industry. General principles of food preservation and their application to the subject of dairying are discussed in class exercises. Crushed fruits, fruit juices, syrups, flavored syrups and other products which are utilized in the dairy trade are manufactured and tested.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSOCIATE PROFESSOR LEVINE.

FORESTRY S-3. (Woodland Management) I.

The first part of this course is devoted to the study and practice of the principles of timber volume estimating and forest mapping. The field work for both parts includes practical problems in forest management. 1 class hour and 1 4-hour laboratory period a week. Credit, 3.

PRACTICAL SCIENCE S-7 and S-8. I. II.

This is a course in applied sciences, chiefly in the fields of chemistry and physics, as they are tools serving the needs of the food and dairy industries. In general, the course is designed to give an introduction to scientific thought and phenomena by means of lectures, textbook study and classroom demonstrations. The emphasis is entirely built around the practical problems in the student's field of work. Practical Science S-8 is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR EVERSON.

PUBLIC SPEAKING S-1 and S-2. I. II.

The aim of the course is to give the student confidence in himself while speaking before groups, and to have him acquire some knowledge of, and practice in, the more practical types of public speaking.

1 class hour a week. Credit, 1.
ASSOCIATE PROFESSOR NIEDECK, MR. ZAITZ,
MR. STELKOVIS.

VETERINARY SCIENCE S-1. (Animal Sanitary Science) I.

Sections for Animal Husbandry, Dairy Industry, and Poultry Husbandry Major students. Conservation of the health of animals is the keystone of successful animal husbandry. This course acquaints students with the essentials upon which the health of animals depends. In order that students may later guard the animals in their charge, attention is given to conditions favoring communicable and non-communicable diseases, and to preventive measures.

3 class hours a week. Credit, 3.
PROFESSOR BULLIS AND ASSOCIATE PROFESSOR SMITH.

VETERINARY SCIENCE S-2. (Applied Animal Sanitary Science) II.

A continuation of S-1. The Animal Husbandry section will study the more common diseases of cattle, horses, sheep, and swine, and the Poultry Husbandry section will study poultry diseases. Causes; development; control; eradication; and preventive measures will be emphasized.

3 class hours a week. Credit, 3.
PROFESSOR BULLIS AND ASSOCIATE PROFESSOR SMITH.

PHYSICAL EDUCATION FOR WOMEN

PROFESSOR TOTMAN.

This program aims at an all-round development of the student. It gives the student activity adapted to her needs; assists in overcoming remediable physical defects and bad health habits; it encourages good health standards, helps her build up skill in sports and games and swimming and leaves her with possibilities for spending leisure time wisely.

REQUIRED COURSES

PHYSICAL EDUCATION S-1. I.

Outdoor season—field hockey, archery, tennis, swimming, volleyball. Indoor season—badminton, special gymnastics, games, swimming, dancing.

3 class hours a week.

Credit, 2.

THE DEPARTMENT.

PHYSICAL EDUCATION S-5. I.

The senior program is arranged to give the student an opportunity to express her desire for wholesome physical recreation, to further develop desirable character traits and social qualities and qualities of leadership.

3 class hours a week.

Credit, 2.

THE DEPARTMENT.

Most major courses in Stockbridge provide time for classes on subjects offered by the Department of Agricultural Engineering at the University. The Stockbridge student learns the capability of machines, the problems in servicing them, and safety in their use. He learns of the versatility of electric power, and that controls for this power vary from the wall switch for the living room lights, to the radio vacuum tube which can operate the poultry house ventilating system. He learns about strength of materials used in machines and buildings, and that the strength of a building to withstand storm can be calculated, so that design, is one of the better forms of insurance. He becomes familiar with the farm level, a little brother of the engineer's transit, and learns how to use it in laying out buildings, terraces and ditches. He learns of the ways these things may be useful as tools in farming, rather than the engineering theory which qualifies him for design, research and development. The Stockbridge student learns how to use and maintain his tools, and what to expect of them in farming operations.

These service courses thus serve the purpose of rounding out the student's training in production, management, and mechanization, the inseparable combination in today's farming. Power, mechanical and electrical, in the hands of farm workers will continue to improve the welfare of the farm families of Massachusetts.

PHYSICAL EDUCATION FOR MEN

PROFESSOR GORE, MR. KOSAKOWSKI, ASSISTANT PROFESSOR DERBY,
ASSISTANT PROFESSOR ROGERS.

REQUIRED COURSES

PHYSICAL EDUCATION S-1. I. (Recreation.—For Freshmen. Outdoor games.)

The following outdoor games are taken up: Softball, touch football, and swimming. Men may elect football or cross-country. The course aims to give every man the opportunity to develop sufficient control over his body to enable him to get pleasure from physical activities and to establish correct health habits. Not required of veterans.

2 laboratory hours a week for first half semester. Credit, 1.
MR. KOSAKOWSKI, ASSISTANT PROFESSOR ROGERS.

PHYSICAL EDUCATION S-5. I. (Recreation.—For Seniors. Outdoor games.)

Includes the games of volleyball, softball and swimming, with the object of giving the men exercise material for use in after school days. Men may elect football or cross-country. Not required of veterans.

2 laboratory hours a week for first half semester. Credit, 1.
MR. KOSAKOWSKI AND THE DEPARTMENT.

ELECTIVE COURSES

PHYSICAL EDUCATION S-4. II. (Recreation.—For freshmen and seniors.)
(Basketball and Indoor Track.) January-March.

Students electing this course must be regular members of the basketball, or indoor track squads and report regularly for practice with those squads.

Credit, 1.
MR. KOSAKOWSKI AND THE DEPARTMENT.

PHYSICAL EDUCATION S-6. II. (Recreation.—For seniors.)

The senior class is divided into three or four major groups according to the number of students electing the spring physical education program. An intramural softball league schedule is played and an indoor and outdoor track meet run off. The group winning the highest average in all three events will have its name engraved on the Stockbridge School spring athletic trophy.

No credit.
MR. KOSAKOWSKI AND THE DEPARTMENT.

RED CROSS LIFE SAVING COURSE

ASSISTANT PROFESSOR ROGERS.

SHORT COURSES AT THE UNIVERSITY OF MASSACHUSETTS

Short courses are based on the idea that the motive which inspires study is the most significant factor in study itself, and that this motive rises when the student himself realizes he faces a problem that calls for a solution. Therefore there is no age limit. Enrolled in short courses are the young and the old, the experienced and the inexperienced, the theoretical and the practical. In this grouping there is a value, since students learn from each other as well as from the instructors. Practically all Short Course students intend to make a direct application of the knowledge given. Hence the aim of Short Course work is to offer the largest amount of information and training in agricultural and horticultural lines in the shortest possible time. During the past thirty years Short Courses have served thousands of students in this Commonwealth, and the demand for these courses since the war has increased greatly due to both veteran and non-veteran demand.

DIRECTORY OF INFORMATION

A. The University

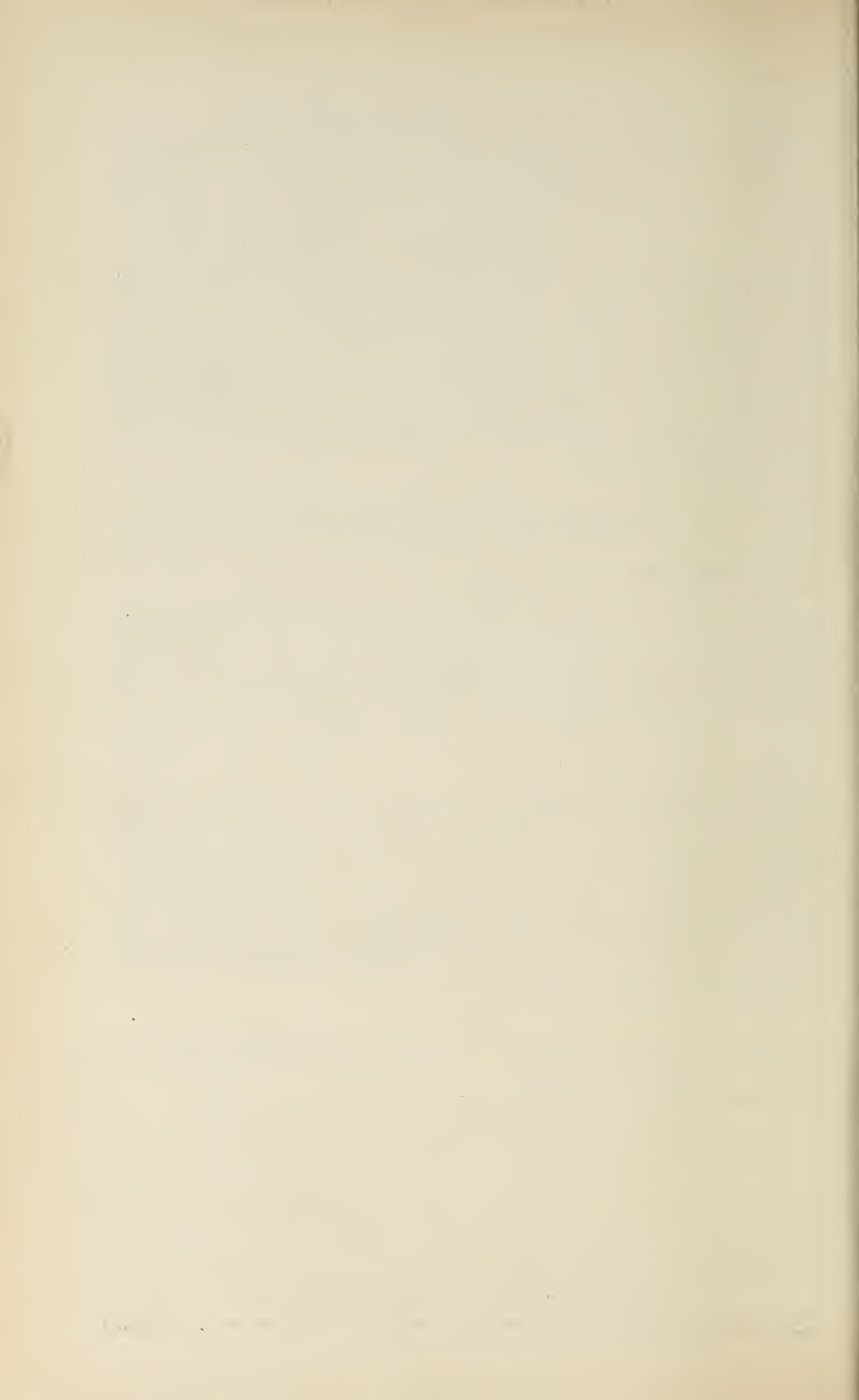
Those desiring University catalogs and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, and those with questions regarding admission to the university, either to the freshman class or to advanced standing should address William L. Machmer, Dean of the University, Amherst, Mass.

B. The Graduate School

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Gilbert L. Woodside, Director of the Graduate School, Amherst, Mass.

C. Short Courses

For information concerning the Short Course Units, the Stockbridge School of Agriculture, write or apply to Roland H. Verbeck, Director of Short Courses, Amherst, Mass.



**APPLICATION FOR ENROLMENT
IN THE
STOCKBRIDGE SCHOOL OF AGRICULTURE**

Name Date
City or
Town Street State

Present Occupation Age
School or College Attended:

Name of School Years in
High School

Place Are you a
Graduate

Indicate by a check mark the course in which you desire to register. Do not check more than one.

- | | |
|---|---|
| 1. Animal Husbandry (Dairy Farming) | 7. Food Management (For Hotel and Restaurant Trade) |
| 2. Dairy Industry (Dairy Plant Operation) | 8. Forestry |
| 3. Poultry Husbandry | 9. Fruit Growing |
| 4. Arboriculture | 10. Ornamental Horticulture (Landscape Gardening) |
| 5. Commercial Vegetable Growing | 11. Turf Maintenance |
| 6. Floriculture | |

References.—I am personally acquainted with the above applicant, and know to be of good moral character, industrious, studious, and physically capable.

1. Name Position

Address

2. Name Position

Address

(Two references are required, and should not be members of your own family. Your teacher, your neighbor, or a former employer, are desirable. These persons should sign the application themselves.)

Mail this blank to ROLAND H. VERBECK, Director of Short Courses
UNIVERSITY OF MASSACHUSETTS, AMHERST, MASS.

Important.—Be sure to file citizenship certificate if State tuition rate is claimed.

FORM II

CERTIFICATE OF CITIZENSHIP

The University of Massachusetts charges a tuition fee of \$200 a semester to students who are not residents of Massachusetts. In order to satisfy the university authorities that an applicant is entitled to state tuition of \$50 a semester, they require a statement signed by the clerk of the city or town in which the applicant resides, certifying to the fact that the parent or guardian of the applicant is a legal resident of said city or town. Where the guardian is certifying to this statement, it will be necessary for him to furnish copies of his appointment by the court. Such a statement may be made on the form below. If this is not presented when the student registers, the Treasurer has no option but to collect tuition on the above basis. When requesting the City Clerk to sign this certificate, an applicant for admission to the university should give the name and address of the parent or legal guardian unless he himself is of legal age.

This is to certify that I am the father.....mother.....legal guardian.....

of
Student's Name

Signed

This is to certify that on the date specified below (Insert name of parent or guardian)

..... is a legal resident of
Parent's Name

....., Massachusetts.
Town or City

Signed
Town or City Clerk

Date
Seal

Mail this blank to ROLAND H. VERBECK, Director of Short Courses

UNIVERSITY OF MASSACHUSETTS, AMHERST, MASS.

This certificate must be filed with application blank if lower tuition rate for citizens of Massachusetts is to be secured.

GRADUATES — 1951

*Stetson Kimball Adams	Leverett, Massachusetts
Robert Moody Adkins	Worcester, Massachusetts
*Edward John Ahern, Jr.	Springfield, Massachusetts
Richard Carl Andrews	Spencer, Massachusetts
Charles David Averka	Auburn, Massachusetts
*Chester Stanley Bak	Derby, Connecticut
Richard Cecil Ballou	Orange, Massachusetts
Richard Albert Barnicle	Waltham, Massachusetts
*Howard Francis Barrell	Worcester, Massachusetts
Richard Baxter Bates, Jr.	Carlisle, Massachusetts
Clifford Luce Belden, Jr.	North Hatfield, Massachusetts
Robert Webber Bishop, Jr.	East Wareham, Massachusetts
Richard Forrest Brown	South Hadley, Massachusetts
Richard Nickerson Brown	Billerica, Massachusetts
*John Francis Bulman	Dedham, Massachusetts
Rupert Frank Burzynski	Springfield, Massachusetts
Wayne Buzzee	Easthampton, Massachusetts
*Orlando Philip Capizzi	West Newton, Massachusetts
Sidney Francis Carl	Hatfield, Massachusetts
*Donald Arthur Carney	Worcester, Massachusetts
Sebastian Cavallaro	Andover, Massachusetts
Frank Tait Chidsey	Longmeadow, Massachusetts
Byron Bartlett Clough	Worcester, Massachusetts
*William Greg Collins, Jr.	Lexington, Massachusetts
Robert Lee Cooper	New Bedford, Massachusetts
Charles Bavel Cummings	Arlington, Massachusetts
*Frederick Kendall Cummings	Woburn, Massachusetts
Eleanor Ruth Cutler	Wayland, Massachusetts
Russell Maurice Davenport	Shelburne Falls, Massachusetts
William Edward Davies	Arlington, Massachusetts
Charles Packard Day	Brimfield, Massachusetts
*Richard Oliver Dean	Shrewsbury, Massachusetts
*Frederick Joseph De Costa	South Boston, Massachusetts
*Nicholas Paul DeSilva	Dorchester, Massachusetts
Gerald Meighan Desmond	Everett, Massachusetts
David Langston Dodge	Sterling Junction, Massachusetts
Paul Joseph Downing	South Weymouth, Massachusetts
*Gerald Joseph Drinkwater	Randolph, Massachusetts
James Eden Drozd	North Lancaster, Massachusetts
David Leslie Dzuris	South Hadley Falls, Massachusetts
Raymond Arthur Eames	East Walpole, Massachusetts
Robert Willis Eaton	Waltham, Massachusetts
*Linwood Boyd Elliott, Jr.	Brimfield, Massachusetts
James Ernest Ellis	Somerville, Massachusetts
*Robert Sylvester Ellsworth	Chester, Massachusetts
Albert Joseph Enrick	Uxbridge, Massachusetts
*Carl Sumner Ericson	Arlington, Massachusetts
David Harmon Ethier	Halifax, Massachusetts
Richard Mansfield Finan	Concord, Massachusetts
Joseph Henry Fitzpatrick	Medway, Massachusetts
Edwin Joseph Fredenburgh, Jr.	Concord, Massachusetts
*Walter Edwin Frost	Vineyard Haven, Massachusetts
*Richard Pascal Gallant	Lawrence, Massachusetts
*Francis Joseph Galvin	Cambridge, Massachusetts
*Bartholomew Joseph Germond	Hardford, Connecticut
*Francis Henry Ghelli	Holliston, Massachusetts
Clyde Standish Gill	Lowell, Massachusetts
Raymond Denis Girouard	Leicester, Massachusetts
Ray Alan Gleason	Clarksburg, Massachusetts
Robert David Goldrick	Framingham, Massachusetts
Emory Ellsworth Grayson, Jr.	Amherst, Massachusetts
Warren Benjamin Greathead	Lowell, Massachusetts
Robert Francis Gregory	East Boston, Massachusetts
*Frederick Harper Griswold	Winsted, Connecticut
Carl John Gustafson, Jr.	North Brookfield, Massachusetts
*Henry Walter Haas	West Springfield, Massachusetts
Richard William Hahn	Lee, Massachusetts
Philip Herbert Hall	Southwick, Massachusetts
Robert Carlton Hall	Williamstown, Massachusetts
Philip Dustin Handy	Cataumet, Massachusetts
Hilton Dwight Hart	Blandford, Massachusetts
*Coburn Morrison Hartman	Worcester, Massachusetts
Lawrence Edward Hartnett, Jr.	Woburn, Massachusetts
*Donald Carl Hays	Huntington, Massachusetts
*Warren Edward Healey	Springfield, Massachusetts
*Edward Herbert Heath	Shutesbury, Massachusetts
Kenneth William Heins	Fitchburg, Massachusetts
*Ernest Albert Hendricks	Northampton, Massachusetts
Deane Freckleton Hill	Melrose, Massachusetts
*William Olaf Holmgren	Brookfield, Massachusetts
Wilford Haynes Hooper	Wellesley, Massachusetts
John Leo Horgan	Brookline, Massachusetts
*Allan Ralph Houghton	New Bedford, Massachusetts
William Albert Hutchinson	Worcester, Massachusetts
Leon Harry Kakitis	Athol, Massachusetts
*Donald James Kelleher	Brockton, Massachusetts

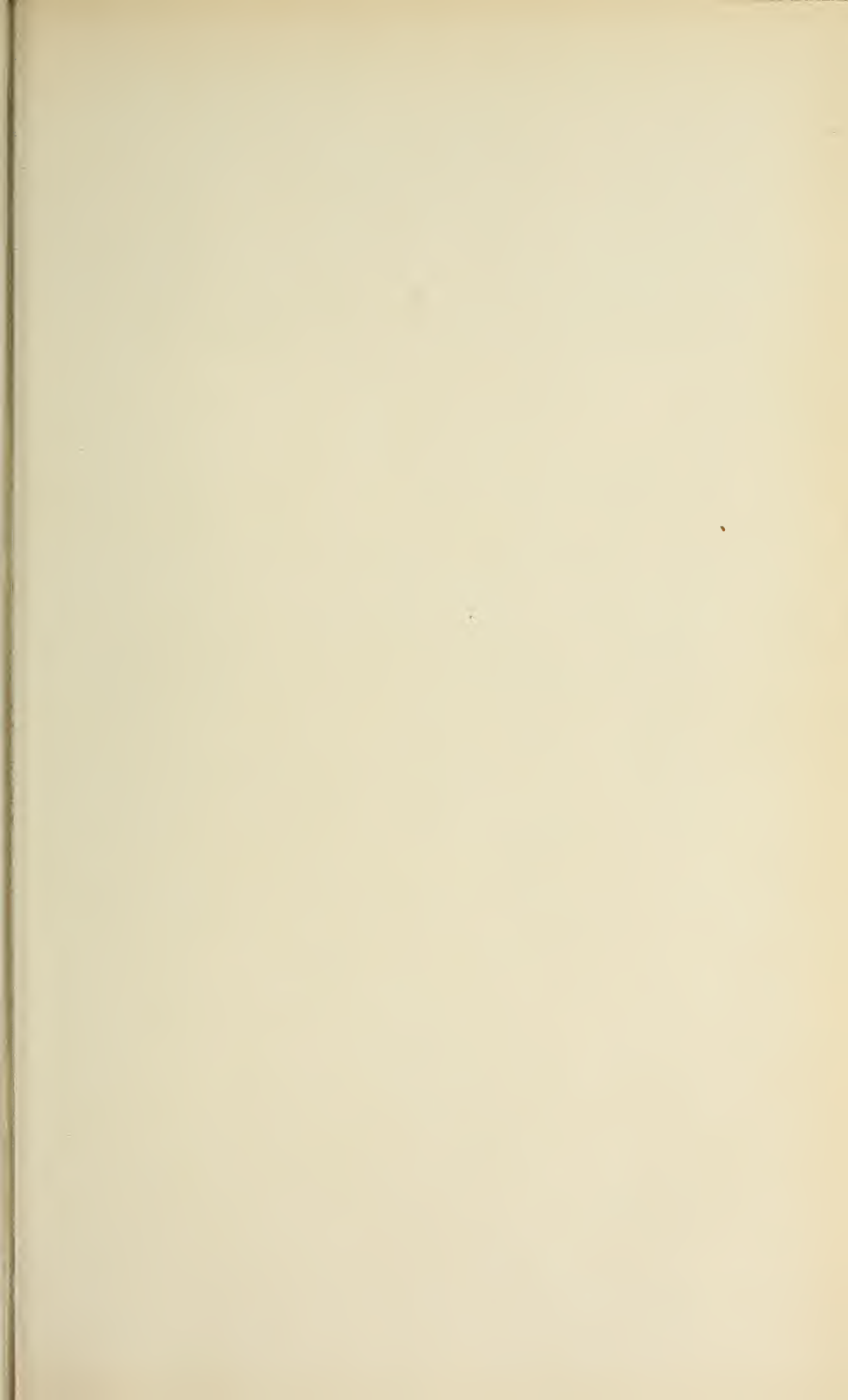
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Charles Leverett Lane, Jr.	Rockport, Massachusetts
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Albert Joseph Lariviere	Granby, Massachusetts
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Richard Post RobinsonNeedham, Massachusetts

*Veterans—World War II







"God grants liberty to those who love it, who are always ready to guard and defend it."

"The cultivation of the earth is the most important labor of man. Unstable is the future of the country which has lost its taste for agriculture. If there is one lesson of history that is unmistakable, it is that national strength lies very near the soil."

—DANIEL WEBSTER.

Born in Salisbury, New Hampshire, 1782-1852. His father a farmer of Scottish stock. Graduated from Dartmouth College in 1801. In 1820 he aided greatly in revising the constitution of Massachusetts. Became one of the greatest orators in the nation. Lived and died in Marshfield, Massachusetts.

*Other University of Massachusetts
Catalogues:*

- Undergraduate Catalogue
- Graduate School Catalogue
- Summer School Catalogue

THE UNIVERSITY
OF MASSACHUSETTS
BULLETIN



Annual Undergraduate Catalogue

UNDERGRADUATE
SCHOOLS ~ 1952-53





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Bulletin

UNIVERSITY
of
MASSACHUSETTS

CATALOGUE OF THE UNIVERSITY

1952-1953



AMHERST, MASSACHUSETTS

VOLUME XLIV

FEBRUARY, 1952

NUMBER 2

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FOREWORD

This Catalogue of the University presents announcements concerning courses, admission, etc., for the sessions of 1952-1953.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.



The University Catalogue for the sessions 1952-53 is part of the Eighty-Eighth Annual Report of the University of Massachusetts and as such is part II of Public Document 31. (Sec. 8, Chapter 75, of the General Laws of Massachusetts.)

UNIVERSITY OF MASSACHUSETTS

UNDERGRADUATE CALENDAR

1952

February 4, Monday, 8:00 A.M. Second semester begins.
February 22, Friday. Washington's Birthday. No University exercises.
April 5, Saturday, 12:00 Noon to April 14, Monday, 8:00 A.M. Spring recess.
April 19, Saturday. Patriot's Day. No University exercises.
May 17, Saturday 12:00 Noon. Classes stop.
May 19, Monday to May 29, Thursday, 5:00 P.M. Final examinations.
May 30, Friday to June 1, Sunday. Commencement.

1952-1953

September 22-24, Monday through Wednesday. Freshman Orientation.
September 22, Monday. Registration of sophomore, junior, senior and graduate students.
September 23, Tuesday. Registration of freshman students.
September 24, Wednesday, 8:00 A.M. **Classes begin for all students.**
September 25, Thursday, 10:45 A.M. First University Convocation.
October 13, Monday. Observance of Columbus Day. No University exercises.
November 11, Tuesday. Armistice Day. No University exercises.
November 26, Wednesday, 12:00 Noon to December 1, Monday, 8:00 A.M. Holiday recess.
December 20, Saturday, 12:00 Noon to January 5, Monday, 8:00 A.M. Holiday recess.
January 5, Monday, 8:00 A.M. Classes resume.
January 22, Thursday, 5:00 P.M. Classes stop.
January 23, Friday. Registration of sophomore, junior, senior and graduate students.
January 24, Saturday. Registration of freshman students.
January 26, Monday to February 4, Wednesday. Final examinations.
February 9, Monday, 8:00 A.M. Second semester begins.
February 23, Monday. Observance of Washington's Birthday. No University exercises.
March 28, Saturday, 12:00 Noon to April 6, Monday. Spring recess.
April 20, Monday. Observance of Patriot's Day. No University exercises.
May 23, Saturday, 12:00 Noon. Classes stop.
May 25, Monday to June 4, Thursday, 5:00 P.M. Final examinations.
May 30, Saturday. Memorial Day. No University exercises.
June 5, Friday to June 7, Sunday. Commencement.

BOARD OF TRUSTEES

October, 1951

MRS. JOSEPH SWAN LEACH, Walpole	1952
RALPH FRED TABER, B.S. (University of Massachusetts), A.M. (Harvard University), West Newton	1952
JOHN MARTIN DEELY, A.B. (Williams College), Lee	1953
CLIFFORD CHESLEY HUBBARD, A.B., PH.D. (Brown University), A.M. (Harvard University), Mansfield	1953
HARRY DUNLAP BROWN, B.S. (University of Massachusetts), Billerica	1954
JOHN WILLIAM HAIGIS, M.A. (Amherst College), Greenfield	1954
JOSEPH WARREN BARTLETT, A.B. (Dartmouth College), LL.B. (Harvard University), LL.D. (University of Massachusetts), Boston	1955
PHILIP FERRY WHITMORE, B.S. (University of Massachusetts), Sunderland	1955
WILLIAM MICHAEL CASHIN, A.B. (Boston College), Milton	1956
WILLIAM AYLOTT ORTON, B.A., MA. (Christ's College, Cambridge), M.SC., D.SC. (University of London), LL.D. (Boston College), Northampton	1956
ERNEST HOFITYZER, B.S. (Ohio State University), Wellesley	1957
ALDEN CHASE BRETT, B.S. (University of Massachusetts), Belmont	1957
MRS. ELIZABETH LAURA MCNAMARA (Graduate Teacher's College), Cambridge	1958
LEONARD CARMICHAEL, S.B., SC.D. (Tufts College), PH.D. (Harvard University), LITT.D. (Portia), LL.D. (Boston University, Colgate University, Northeastern University, University of Rhode Island, St. Lawrence University), Medford	1958

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Memorial Hall

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October, 1951

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- KENNETH LLOYD BULLIS, D.V.M. (Iowa State College), M.S. (University of Massachusetts), *Professor of Veterinary Science and Head of Department*. Paige Laboratory

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Drill Hall

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Stockbridge Hall

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Liberal Arts Annex

¹ On leave of absence.

² On leave of absence for military service.

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Edna Skinner Hall
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¹ On leave of absence.

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- EDWARD LYON DAVIS, B.A. (Harvard University), *Teaching Fellow in Botany*. Clark Hall

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East Wareham

¹ On leave of absence.

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Economics Nutrition. Edna Skinner Hall
- DAVID HENRY MARSDEN, B.S., M.S. (University of Massachusetts) *Assist-*
ant Professor, Research, Shade Tree Laboratories.
Shade Tree Laboratory
- MALCOLM ARTHUR MCKENZIE, PH.B., A.M., PH.D. (Brown University),
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- WILLIAM SAMUEL MUELLER, B.S. (University of Illinois), M.S. (Rutgers
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- MARGARET HELEN O'DONNELL, *Administrative Director of Experiment*
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- LEONARD RAYMOND PARKINSON, B.S. (University of New Hampshire), M.S. (University of Massachusetts), *Instructor, Research, Food Technology.* Hatch Laboratory
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Heads of those departments functioning in the Experiment Station, although not listed here, are also recognized as members of the staff.

¹ On leave of absence.

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October, 1951

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BETTY ANN BACHMAN, B.S. (Texas State College for Women), M.A.
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Paige Laboratory

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² On leave of absence for military service.

ROBERT THOMAS WETHERBEE, B.S. (University of Massachusetts), *Assistant Professor, Research, Feeds and Fertilizers.*

West Experiment Station

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(Member of Staff of State Department of Education)

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October, 1951

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- ANTHONY WAYNE SYLSTRA, D.V.M. (New York State Veterinary College), *Extension Professor of Poultry Pathology.* Paige Laboratory
- WILBUR HERMAN THIES, B.S., M.S. (Michigan State College), *Extension Professor of Horticulture.* French Hall
- CECIL LYMAN THOMSON, B.S.A. (University of Toronto), M.S. (University of Minnesota), *Extension Professor of Vegetable Crops.* French Hall

¹ On leave of absence.

HERBERT SIDNEY VAUGHAN, B.S. (University of Massachusetts), *Extension Professor; Head, Extension Division of Agriculture; State County Agent Leader.*
South College.

GEORGE WILLIAM WESTCOTT, B.S., M.S. (Iowa State College), M.P.A. (Harvard University), *Extension Professor of Agricultural Economics.*
Stockbridge Hall

ELLSWORTH HAINES WHEELER, B.S. (University of Massachusetts), M.S., PH.D. (Cornell University), *Extension Professor of Entomology.*
Fernald Hall

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1951-1952

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Chairman R. H. BARRETT, L. E. BRIGGS, CARPENTER, GODING, GROW, MERIAM, RIVERS, RHODES, VONDELL, WANNLUND, WYMAN.

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Chairman CURTIS, A. M. COOK, DICKINSON, KAUFFMAN, PIERPONT, VALLANCE and Student Representation.

CAMPUS PLANNING

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Chairman MACHMER, CADIGAN, R. C. FOLEY, GAMBLE, GOLDBERG, KAUFFMAN, KEYSER, H. S. MITCHELL, NEET, PURVIS, RITCHIE, TRIPPENSEE, WOODSIDE.

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GAMBLE.

Elected faculty members:

Term expires 1952. COOK, HARDY, JEFFREY, TOTMAN.

Term expires 1953. CARY, ROYS, L. R. WILSON.

Term expires 1954. DITTFACH, ELLERT, J. F. HANSON, HOLDSWORTH,
KIMBALL.

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TOTMAN, VARLEY, and Student Representation.

* Alumni representative

UNIVERSITY OF MASSACHUSETTS

The University of Massachusetts is the State Institution of the Commonwealth founded under the provisions of the Morrill Land Grant Act of Congress of 1862. This Act provided in each state for "the endowment for and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Massachusetts accepted the provisions of the Morrill Act in 1863 by founding a new college at Amherst to be known as "Massachusetts Agricultural College." Chapter 75 of the General Laws of the Commonwealth states that "the leading object of the College shall be to teach subjects relating to agriculture and the mechanic arts so as to promote liberal and practical education. Its curriculum may include other scientific and classical studies and shall include military tactics."

The Trustees of Massachusetts Agricultural College were incorporated in 1863, and officers were appointed in that year. It was not until October 2, 1867, however, that the College was formally opened to students. At that time there were four teachers on the faculty and four wooden buildings on the campus. The enrollment steadily increased during the first term, however, and by December 1867, forty-seven students had been admitted. From this modest beginning the College has grown steadily, both in number of students and scope of its work. In April, 1931, the name of the institution was changed by legislative enactment to Massachusetts State College. In 1939 the Trustees voted to award the A.B. degree as well as the B.S., which previously had been the undergraduate degree of the College. In May, 1947 the College became the University of Massachusetts.

FUNCTIONS OF THE UNIVERSITY

The University of Massachusetts now serves the Commonwealth in the three important fields of resident instruction, re-

search, and extension. Since all three services are organized on the campus, students have the advantages that come from contact with persons carrying education to the State at large, with others conducting original investigations, as well as those engaged in formal instruction.

RESIDENT INSTRUCTION

DEGREE COURSES

THE UNDERGRADUATE COLLEGE. The University offers four-year undergraduate instruction leading to the following degrees: Bachelor of Science, Bachelor of Arts, Bachelor of Science in Agricultural, Civil, Electrical and Mechanical Engineering, Bachelor of Business Administration and Bachelor of Vocational Agriculture.

This instruction is assigned to the College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, Home Economics, and to the Division of Physical Education. The aim of the four-year course is to give as high a degree of proficiency in some particular branch of learning as is possible without sacrificing the breadth, knowledge, and training which should characterize a well-rounded college education.

The degree of Bachelor of Science is conferred upon those candidates who complete the curriculum requirements of the freshman and sophomore years, and 60 junior-senior credits including the specialization requirements in a particular science department of the College of Arts and Science. The Bachelor of Science degree is awarded also to students who complete the curriculum requirements of the Schools of Agriculture and Horticulture, Home Economics, and the Division of Physical Education for men. This degree may also be granted to students majoring in Education or Psychology who complete a minimum of 15 junior-senior credits in science departments of the College.

The degree of Bachelor of Arts is awarded to all candidates who complete the curriculum requirements of the freshman and sophomore years in the College of Arts and Sciences and 60 junior-senior credits including the specialization requirements of some department other than science in the College. This degree may be awarded also to majors in a science department who select a minimum of 18 junior-senior credits in non-science departments of the College.

All graduates from the School of Engineering will receive the appropriate degrees of Bachelor of Science in Civil Engineering, Electrical Engineering, Mechanical Engineering and Agricultural Engineering.

All graduates from the School of Business Administration will receive the degree of Bachelor of Business Administration.

Special arrangements are made for some graduates of county agricultural schools and of agricultural departments of certain high schools to complete the college course with majors in agriculture or horticulture. Upon the completion of their course they will be granted a Bachelor of Vocational Agriculture degree.

GRADUATE SCHOOL

THE GRADUATE SCHOOL. Graduate courses leading to advanced degrees are available in the Graduate School. Majors leading to the Master of Science or Doctor of Philosophy degree may be taken in the following fields: Agronomy, Bacteriology, Botany, Chemistry, Economics, Entomology, and Food Science.

In addition, the following departments offer major work leading to a Master of Science degree only: Agricultural Economics and Farm Management, Animal Husbandry, Business Administration, Dairy Industry, Education, Engineering, Floriculture, Geology and Mineralogy, Home Economics, Mathematics, Olericulture, Physical Education (Men), Pomology, Poultry Science, Psychology, Wildlife Management, and Zoology.

Students may enroll as candidates for the Master of Arts degree, subject to the conditions to be found in the Graduate School catalogue, in the following fields: Economics, English, History, Philosophy, and Romance Languages.

The degree of Master of Landscape Architecture is granted to students completing the two years' graduate work offered by the Department of Landscape Architecture, while students taking the equivalent of one year's graduate work in that major may be granted the degree of Bachelor of Landscape Architecture.

Several other departments in the University, while not regularly organized for major work in the Graduate School, do, nevertheless, offer courses which may be selected for minor credit. These are: Forestry, German, Physics, Sociology, and Veterinary Science.

The general requirements of the Graduate School regarding entrance, residence, credits, tuition, fees, etc., together with specific

information concerning details of interest to prospective students, are outlined in a separate bulletin, which may be obtained upon request from the Dean of the Graduate School.

SUMMER SCHOOL

THE SUMMER SCHOOL. A Summer Session is available for those desiring to accelerate their program. This Summer Session is planned to serve the needs of (1) all students enrolled as candidates for a degree at any college, (2) persons desiring refresher or professional improvement courses, (3) graduate students desirous of meeting specific requirements in certain fields, and (4) any adult person who finds courses suited to his preparation and needs. Applications for the Summer School may be obtained by writing to the Dean of the University.

NON-DEGREE SHORT COURSES

The University, through its Short Course division, as a special service under the Land-Grant Act by which it was established, provides a complete program of two-year technical and vocational courses in the fields of agriculture and horticulture. These train for all types of commercial farming operations as practiced in New England.

Other short courses, varying in length from one to ten weeks, furnish supplementary training for city and town sanitary inspectors, tree wardens and city foresters, golf course greenskeepers, and skilled workers in dairy and ice cream plants.

THE STOCKBRIDGE SCHOOL OF AGRICULTURE. This School was organized at the University in 1918 under the name of "The Two Year Course in Practical Agriculture." Its purpose was to meet the demand for shorter courses in agriculture which might be taken by high school graduates who could not satisfy college entrance requirements, or who, for one reason or another, were unable to take the four year college course. In 1928 the School was given its present name in honor of Levi Stockbridge, the first professor of agriculture at the University and its fifth president.

This program trains men and women primarily for the practice of farming or associated agricultural industries. Graduation from the School does not fulfill the requirements for entrance into the degree course, nor are credits earned during the course regularly transferable toward credit for a degree. A diploma is awarded for satisfactory completion of any two-year course; for other short courses certificates are presented.

As the two-year program is now organized, a student may choose any one of eleven vocational courses, including dairy farming; dairy manufactures or milk plant operation; poultry farming; arboriculture, or the care of trees; fine turf maintenance for golf courses, cemeteries, parks, and playgrounds; commercial flower growing, both retail and wholesale; food management for clubs, hotels, and restaurants; commercial fruit farming; ornamental horticulture, or landscape gardening; commercial vegetable farming; and applied forestry for timber growing and forest product industries.

On-the-job placement training is required of all first-year students in the second semester for a period of four to seven months, depending on type of employment. No student can earn a diploma of graduation without this applied training experience. Wages earned can pay a large part of the second year expenses if the student is forced to economize.

Limited enrollment quotas in each major course make necessary early filing of application. No formal entrance examinations are required for non-degree short courses.

A Catalog, giving complete description of all two-year courses offered in The Stockbridge School of Agriculture, as well as full details on estimated costs, employment opportunities in each field, and entrance arrangements, is available. Application form is printed in the catalog. Write to Director of Short Courses, University of Massachusetts, Amherst, Massachusetts.

NOTE: (For interview or personal conference the Short Course Office is open Monday through Friday from 8:30 to 12:00 and 1:00 to 5:00, state and national holidays excepted.)

RESEARCH AND REGULATORY SERVICES

The University of Massachusetts serves the fields of Agriculture and Horticulture through its Experiment Station, which provides research and regulatory services. Experiment Stations were established in all States as the need for development of practical information on subjects relating to Agriculture became apparent. Through the efforts of experiment Stations a fund of scientific knowledge applicable to Agriculture and Horticulture has been accumulated, and research workers in the Experiment Stations continue to contribute to this knowledge by constant research and experimentation.

At the University of Massachusetts, the Experiment Station service has expanded until it now deals with problems in the fol-

lowing fields of specialization: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Dairy Industry, Economics, Engineering, Entomology, Horticulture, Floriculture, Food Technology, Nutrition, Olericulture, Pomology, Poultry Science, and Veterinary Science. Most of the research activities of the University of Massachusetts are undertaken at the main Experiment Station at Amherst. There are, however, two substations, one at Waltham, devoted largely to the problems of Horticulture as applied to Olericulture, Floriculture, and Nursery culture, and one at East Wareham, where attempts are in progress to solve the problems of the cranberry and blueberry growers.

In addition to the work described above, the administration of certain regulatory services, pertaining to the sale of feeds, fertilizers, and seeds and to the use of dairy glassware is also assigned to the Experiment Station, which is equipped with the necessary laboratory facilities and personnel for that purpose.

EXTENSION SERVICE

The Massachusetts Extension Service is a cooperative teaching effort between the United States Department of Agriculture, the University of Massachusetts, and the several counties of the State. The work of the Extension Service is carried on through unified teaching programs in all parts of Massachusetts. The Extension Service assists the people of the farm, the home, and the rural communities to improve agriculture, home making, and rural life. The University of Massachusetts is the State Extension Service headquarters. Extension educational teaching plans are made in council with the people who determine their problems and help to suggest methods and practices for their solution.

The Extension effort was brought about by the Smith-Lever Law, passed by Congress on May 8, 1914. Since that time, the service has grown to a staff of over 100 State and County workers who conduct an educational program in all phases of agriculture and home-making among the adults and young people (4-H Club work) of the State. All types of methods, including subject matter, meetings, demonstrations, farm and home visits, publications, visual aid, and radio are used in carrying out this educational program directly in the farm and rural areas of the State. During the war emergency, the Extension Service extended its home food production and preservation program to the urban areas.

THE UNIVERSITY CAMPUS

The University of Massachusetts is located near the geographical center of the state at Amherst. This town of about 7,000 overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted both for its scenic beauty and its educational institutions. The setting for the University, therefore, is ideal. The surrounding country is a rich agricultural region providing an excellent outdoor laboratory for the work in Agriculture and Horticulture, as well as for the Biological Sciences and Geology. Those interested in other Sciences and in Liberal Arts study under equally favorable conditions, both because of the facilities at the University and its location in this educational area of the valley.

Amherst is eighty-seven miles from Boston and may be reached by bus connections from Northampton, Greenfield, Springfield, and Worcester. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. In addition, the University owns another area of seven hundred and fifty-five acres six miles north of the campus on Mount Toby. This is used as a demonstration forest.

The University also operates a horticultural field station at Waltham and a cranberry field station at East Wareham.

BUILDINGS AND EQUIPMENT

The campus is laid out in the form of an oval attractively set off by the College Pond in the center. Around this oval are grouped the main buildings of the University. Those using the attached map of the campus are advised to start at South College, the Administration Building, and proceed in the order indicated below.

SOUTH COLLEGE.—Here are located the administrative offices including those of the President, Dean, Registrar, Treasurer, Secretary, Director of the Extension Service, Director of the Placement Service, Dean of Women, and Dean of Men. Erected 1885.

NORTH COLLEGE.—The University Store, offices and classrooms of the School of Business Administration and the Department of Economics. Erected 1868.

FARLEY 4-H CLUB BUILDING AND BOWDITCH LODGE.—Headquarters for 4-H Club Activities. Erected 1933 and 1936 respectively by funds contributed by 4-H Club members and interested friends and organizations. The former was named to honor George L. Farley for twenty-five years State Leader of County Club Agents;

the latter for Nathaniel Bowditch, Trustee of the University from 1896-1945.

POWER PLANT.—General Maintenance.

UNIVERSITY FARM.—In the University barns are maintained Percheron and Morgan horses; Aberdeen-Angus, Ayrshire, Guernsey, Hereford, Jersey and Holstein cattle; Shropshire and Southdown sheep; and Chester White swine. The university farm is operated as a livestock farm, producing all its necessary roughage in the form of pastures, hay and silage and a portion of its required grain.

LIBERAL ARTS BUILDING.—Classrooms, laboratories and offices for Foreign Languages, Psychology and Education. Erected 1947.

GRINNELL ARENA AND ABATTOIR.—Erected in 1910 primarily for livestock judging. An abattoir was constructed in 1930 as an addition to the original building. Named in honor of James S. Grinnell, for twenty-two years a trustee of the University.

FLINT LABORATORY.—Laboratories and classrooms for Dairy Industry. Erected in 1911 and named for Charles L. Flint, fourth president of the University.

STOCKBRIDGE HALL.—Departments of Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Engineering and Poultry Husbandry. Erected in 1914 and named for Levi Stockbridge, first Professor of Agriculture and a former President of the University. Bowker Auditorium, the main auditorium of the University, is located here. It is named for William H. Bowker, a member of the first graduating class, a trustee of the University, and one of the pioneers in the fertilizer industry.

CHENOWETH LABORATORY.—Classrooms and laboratories including a large Commercial Practices Laboratory for the Department of Food Technology. Erected 1929 and named in honor of Walter W. Chenoweth, pioneer in the field of Food Technology and first Head of the Department.

HATCH LABORATORY.—A laboratory where small animals and chickens are used in connection with investigations into human, animal, and poultry nutrition.

ENGINEERING ANNEX.—Laboratories, classrooms, and offices for the School of Engineering. Erected 1948.

ENGINEERING SHOP.—Laboratories and shop for machine tools, woodworking, motors, and welding instruction. Erected 1916.

DRAPER HALL.—University Dining Hall. Erected 1903 with an addition in 1912. Named in honor of James Draper, for twenty years a trustee of the University. Annex erected 1947.

PAIGE LABORATORY.—Erected in 1950 and named in honor of James B. Paige, Professor of Veterinary Science from 1891-1922. The building contains classrooms and laboratories. Laboratories for State Control and research work in animal diseases are located here.

GUNNESS LABORATORY.—Laboratories for internal combustion engines, materials testing, fluid mechanics, heating, air conditioning and refrigeration, electrical machinery, electrical circuits, as well as classrooms and offices for the School of Engineering. Built in 1948 and named in honor of Christian I. Gunness, Professor of Agricultural Engineering from 1914 to 1946.

ELECTRICAL ENGINEERING WING.—Completed in 1950, this portion of the proposed main Engineering building provides laboratories for Industrial Electronics, Communications, Ultra High Frequency, Electrical Measurements, Illumination and Metallurgy, as well as classrooms and offices for the School of Engineering. This structure is planned as a wing for the future main Engineering building of the University.

GOESSMANN LABORATORY.—Contains eight large laboratories, an auditorium, chemical library, and lecture rooms. The east wing of the third floor is used by the Experiment Station chemists. The remainder of the building is for resident instruction in Chemistry. Erected in 1924 and named in honor of Charles A. Goessmann, first Professor of Chemistry at the University.

WEST EXPERIMENT STATION.—The State Control Service is centralized here. Fertilizers, seeds, and feeds are analyzed or inspected in accordance with the state law. Erected 1886.

EAST EXPERIMENT STATION.—Here are located the offices of the Director of the Experiment Station and Graduate School and other administrative officials.

ABIGAIL ADAMS HOUSE.—Women's dormitory accommodating 100 students. Erected in 1919 and named for Abigail Adams, wife of John Adams, second President of the United States.

THE HOMESTEAD.—Girls majoring in Home Economics receive their Home Management practice here. This is a fine old colonial homestead newly equipped with all the modern conveniences of the home.

HAMLIN HOUSE.—A self-liquidating dormitory housing 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1949. Named for Margaret P. Hamlin, first Placement Officer for Women from 1919 to 1948.

KNOWLTON HOUSE.—A self-liquidating dormitory with accommodations for 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1950. Named in honor of Helen Knowlton, Associate Professor of Home Economics, 1924-1941.

LEWIS HOUSE.—Women's dormitory accommodating 150 students. A self-liquidating dormitory erected under the sponsorship of the Associate Alumni in 1940 and named in honor of Edward M. Lewis, Dean of the College 1914-25 and President 1925-27.

THATCHER HOUSE.—Women's dormitory with facilities for 150 students. Erected in 1935 and named in honor of Rosecoe W. Thatcher, President of the College 1927-32.

UNIVERSITY INFIRMARY.—A group of three buildings, one for bed patients, one for out patients and a third for contagious cases.

MARSHALL HALL.—Erected in 1915 and named for Dr. Charles Marshall, a former Professor of Bacteriology and Director of the Graduate School. The building provides laboratories and classroom space for the Department of Bacteriology and the Department of Zoology.

SKINNER HALL.—Laboratories, classrooms and offices for the School of Home Economics. Erected in 1947 and named in honor of Edna L. Skinner, first Dean of the School of Home Economics.

HASBROUCK PHYSICS LABORATORY.—Completed in 1949. Contains laboratories and lecture rooms designed for the various main divisions of Physics. Named in honor of Philip B. Hasbrouck, Professor of Physics and Registrar of the College during the period 1905 to 1924.

CONSERVATION BUILDING.—Formerly the Old Botany Museum, erected 1867. Houses laboratories, classrooms and offices for the Department of Forestry and Wildlife Management.

FISHER LABORATORY.—Erected in 1910 and named for Jabez Fisher, one of the foremost early horticulturists of the state. Laboratories for Pomology. Included are a quick freezing room, six refrigerator rooms, two rooms for the storage of frozen products, two classrooms, and three packing rooms.

WILD LIFE LABORATORY.—Laboratories for graduate students in Wild Life Management.

WILDER HALL.—Here are the classrooms, drafting rooms, and offices of the Department of Landscape Architecture. Erected in 1905 and named for Marshall P. Wilder, a pioneer in the movement for agricultural education in Massachusetts, and one of the first trustees of the College.

FRENCH HALL.—French Hall, built in 1908 and named in honor of Henry F. French, the first President of the College, houses the Departments of Floriculture, Pomology, and Olericulture. In the rear of the building is the new Durfee range of greenhouses, built in 1908 and devoted to the growing of carnations, roses, chrysanthemums, etc. One house is maintained as a conservatory and contains a collection of plants used primarily for decorative purposes. The old Durfee range just north of French includes a collection of tropical and semi-tropical plants of botanical and horticultural importance. It was erected in 1867 from money given by Dr. Nathan Durfee of Fall River, treasurer of the board of trustees.

STOCKBRIDGE HOUSE.—Faculty Club House.

SHADE TREE LABORATORIES.—Constructed in 1948 for research on shade tree problems including Dutch Elm Disease.

CLARK HALL.—Offices, lecture rooms, laboratories, and greenhouses of the Department of Botany are located here. The herbarium contains about 40,000 sheets of seed plants and ferns, 2,500 sheets of liverworts and mosses, and a collection of 20,000 specimens of fungi. The building was erected in 1906 and named in honor of William S. Clark, President of the College and Professor of Botany from 1867 to 1879.

FERNALD HALL.—Erected in 1909 and named in honor of Professor Charles H. Fernald who served the College from 1886 to 1909, built up a strong Department of Zoology, created the Department of Entomology, and acted as Director of the Graduate School. Fernald Hall houses the Departments of Entomology and Geology and offices and classrooms of the Department of Zoology. Offices and laboratories of the Western Sanitary District, Massachusetts Department of Public Health, are also located here. The Entomology collection includes over 160,000 insects. There are also Geological and Zoological museums.

MATHEMATICS BUILDING.—Classrooms and offices of the Mathematics Department.

MILLS HOUSE.—Men's dormitory for 150 students. A self-liquidating dormitory erected in 1948 under the sponsorship of the Associate Alumni. Named in honor of George F. Mills, teacher of English from 1899 to 1914 and Head of the Division of Humanities.

BROOKS HOUSE.—Men's self-liquidating dormitory. Named in honor of William Penn Brooks, Professor of Agriculture and Director of the Experiment Station, 1888-1921.

BUTTERFIELD HOUSE.—Men's dormitory including dining hall. Accommodates 147 students. A self-liquidating dormitory erected in 1941 under the sponsorship of the Associate Alumni. Named in honor of Kenyon L. Butterfield, President of the College 1906-1924.

CHADBOURNE HOUSE.—Men's dormitory for 150 students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of Paul Ansel Chadbourne, President 1866-67 and 1882-83.

BAKER HOUSE.—Men's dormitory accommodating 360 students. A self-liquidating dormitory erected 1951 by the Alumni Building Corporation. Named in honor of Hugh P. Baker, President of the University from 1933 to 1947.

GREENOUGH HOUSE.—Men's dormitory and dining hall. Houses 148 students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of James Carruthers Greenough, President of the University from 1883-86.

EXTENSION SERVICE BUILDING.—Headquarters for the Massachusetts Extension Service.

CURRY S. HICKS PHYSICAL EDUCATION BUILDING.—Erected in 1931 from funds contributed by Alumni and friends of the College plus an appropriation by the state legislature. Contains a large swimming pool, an exercise hall, basketball floor, and locker room. The Health Office and x-ray room are also located here. Named for Curry S. Hicks, Professor and Head of the Division of Physical Education from 1911 to 1949.

ALUMNI FIELD.—So called because both funds and labor for its construction were contributed by alumni and students. Included are a baseball diamond, football and soccer fields, and a cinder track. Ten tennis courts are adjacent to the Physical Education Building.

ATHLETIC FIELD FOR WOMEN.—A large field west of the Physical Educational Building provides space for archery, softball, field hockey, and other women's activities.

FEDERAL CIRCLE.—A series of temporary buildings furnishing 50 apartments of varying size for married veterans. Erected in 1946 in cooperation with the Federal Government.

COUNTY CIRCLE.—Five residence halls erected in 1948 by the Commonwealth. Hampshire and Suffolk Houses contain 30 two and three room apartments for married persons and their families.

Plymouth, Berkshire, and Middlesex Houses contain dormitory rooms for approximately 144 students each.

COLLEGE ARMORY.—Contains in addition to the offices of the Department of Military Science, the offices, locker and dressing rooms, and exercise hall for the Department of Physical Education for Women.

MEMORIAL HALL.—Erected in 1921 by Alumni and friends in memory of those men of the College who died in World War I. Included is a Memorial Room in which the names of those members of the College family who died in the service of their country are appropriately enshrined. This building is a social center of student life. Alumni headquarters are here, as well as the offices of student organizations including the Senate, Collegian, and Index. The Associate Alumni are at the present time in the process of raising a fund to add a large wing to this building. The purpose of the new wing is to commemorate the sacrifices made by our college men who gave their lives for their country in World War II.

OLD CHAPEL.—Erected in 1885. Auditorium, seminar room, classrooms, and offices for English and History. The chime in the Chapel tower was presented in 1937 in memory of Warren Elmer Hinds of the class of 1899 by his classmate, Bernard H. Smith.

GOODELL LIBRARY.—Goodell Library is named in honor of Henry Hill Goodell, who served the College from 1867-1905. He was President from 1886 to 1905 and because of his deep enthusiasm for books also acted as Librarian of the College.

Goodell Library is virtually a fireproof building erected in 1935. Its plan is unique in that the book-stacks are open freely for inspection and borrowing.

The main floor includes a large reading room, a reference room, delivery desk, and cataloging and administrative offices. On the second floor is another large reading room, commonly used for reserve book reading. There are also studies for faculty and students and the University of Massachusetts Memorabilia Room.

In addition to Goodell Library there are 52 departmental libraries ranging from small collections to sizable separate libraries with reading rooms and valuable collections of reference and textbooks.

The complete library system contains 160,000 volumes and is growing at the rate of over 4,000 volumes a year. The library regularly receives 600 periodicals, and also the serial publications of learned societies. It is also a depository for government documents of the United States Department of Agriculture and the various State Experiment Stations.

INFORMATION CONCERNING THE UNIVERSITY COURSE

The sections of the catalogue that follow are primarily for undergraduate students in the four year degree course. Those interested in graduate study are referred to the Graduate School catalogue, and in short courses, to the catalogue of the Stockbridge School of Agriculture and other short course publications.

STUDENT EXPENSES

Expenses vary from approximately \$750 to \$850 per year for the normally economical student. First year costs are usually greater than those of the other three years and there is less opportunity to earn. A student is advised to have a definite plan for meeting the expenses of the first year before entering.

The following estimate of a year's expenses, based upon last year's cost, includes only those items which are strictly college and does not include amounts for clothing, laundry, travel, etc. These costs vary slightly from year to year. Tuition for residents of Massachusetts is \$100 per year and for others \$400.

	Normal
Tuition (citizens of Massachusetts)	\$100.00
Room in college dormitory or private home (ave.) .	165.00
Board at University Dining Hall	430.00
Books, stationery, and other supplies	90.00
Student Tax (approx.)	38.50
	\$823.50

INITIAL PAYMENT FOR FRESHMEN

The initial payment required of freshmen at the time of fall registration is indicated below and is made up of the following items:

Tuition (citizens of Massachusetts)	\$ 50.00
Room rent (dormitory) approximately	82.50
Board (University Dining Hall)	155.00
Military Uniform (men students)	30.00
Student Tax	20.00
Books, Stationery, etc.	45.00
	\$382.50

The above are only approximate figures. A bill will be rendered to the parent of each student prior to the opening of the University.

TUITION.—As a state institution the University of Massachusetts offers a low rate of tuition to all students entering from the Commonwealth. Eligibility for admission under the low residential rate is determined in accordance with the following policy established by the Board of Trustees.

A student must present evidence satisfactory to the Treasurer of the University that his domicile is in the Commonwealth of Massachusetts in order to be considered eligible to register in the University as a resident student. This means that he must have established a *bona fide* residence in the Commonwealth with the intention of continuing to maintain it as such.

The domicile of a minor shall follow that of the parents unless such minor has been emancipated. In case of emancipation the student, in addition to the requirements of these regulations respecting residence, shall present satisfactory proof respecting emancipation. Minors under guardianship shall be required to present, in addition to the certification of the domicile of the guardian, satisfactory documentary evidence of the appointment of the guardian.

No student shall be considered to have gained residence by reason of his attendance in the University nor shall a student lose residential preference during his continuous attendance at the University.

The residence of a wife shall follow that of the husband.

The prescribed form of application for classification as to residence status must be executed by each student. Misrepresentation of facts in order to evade the payment of out-of-state tuition shall be considered sufficient cause for suspension or permanent exclusion from the University.

Discretion to adjust individual cases within the spirit of these rules is lodged with the President of the University.

BOARD.—The University provides three dining halls for students at Butterfield House, Greenough House and Draper Hall. The dining halls at Butterfield and Greenough dormitories are intended primarily to provide students housed in that area, including residents of Chadbourne, Mills and Brooks Houses.

All freshmen except commuters will be required to board at University dining halls on a five-day week basis.

Sophomores and juniors residing in University dormitories and other campus buildings will also be required to board at University dining halls except that such students who are members of fraternities or sororities may be permitted upon request to board at their respective fraternities or sororities.

Any student who wishes may board at University dining halls on the ticket plan or cash basis.

MILITARY UNIFORM.—All students taking basic military drill are required to make a deposit of \$30 for the uniform. A rebate of this amount is made when the uniform is returned.

STUDENT ACTIVITY TAX.—This tax, authorized by vote of the undergraduate students with the approval of the Board of Trustees, provides each student with the Collegian, the student newspaper; the Index, the University annual; Handbook, Concert course, and student government, class and other activities.

ADVANCE PAYMENT

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Registrar that they are accepted for admission. This will be considered as first payment on registration fee, which will be due at time of matriculation in September. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

A Certificate of Residence form furnished by the University must be properly filled out by the parent and the town or city clerk and returned with the \$15.00 advance payment.

WHEN PAYMENTS ARE DUE

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board, and room rent in University Dormitories are due and payable seven days prior to the date of registration for each semester. Bills will be rendered in advance and payment may best be made by mail. Students may not register until registration charges are paid.

LATE REGISTRATIONS

Any student who does not make payment of his semester charges within the time specified or who does not complete his registration on the date prescribed will be required to pay a fine of \$5.00.

REFUNDS

A student who leaves the University for any reason before a semester is completed will be granted refunds of tuition and fees in accordance with the following schedule:

- a. Within the first two weeks from the date of registration—80%.
- b. Third week—60%.
- c. Fourth week—40%.
- d. Fifth week—20%.
- e. After fifth week—no refund.

Prepaid board will be refunded on a prorated basis. There will be no refund of prepaid rent.

VETERANS' INFORMATION

Veterans who are entering the University for the first time under the G. I. bill must present Certificate of Eligibility at registration. This may be obtained from your nearest Veterans Administration office. Veterans failing to obtain Certificate of Eligibility must make payment of tuition and fees in order to register. Board and room fees must be paid in advance whether enrolled under the G. I. bill or not.

Veterans who are transferring to the University of Massachusetts from another institution or who have done summer work at another institution will be required to submit a supplemental Certificate of Eligibility at registration. This may be obtained by applying through the veterans' office at the institution last attended.

FINANCIAL REQUIREMENTS FOR GRADUATION OR
HONORABLE DISMISSAL

Diplomas, transcripts of record, and letters of honorable dismissal will be withheld from all students who have not paid all bills and all loans due the University or all legitimate bills for room rent, board, and medical fees due fraternities or private individuals. All such bills due the University must be paid ten days preceding Commencement. If paid after that date and the student is otherwise eligible, he may graduate the following year.

Private creditors of students must present itemized statements of charges to the Treasurer of the University at least 15 days before graduation if they wish to have their claims recognized by the University.

FINANCIAL AID

Scholarships, loans, and part-time employment are available for a limited number of needy and deserving students.

AID FOR FRESHMAN YEAR.—Freshmen are eligible for scholarships and part-time employment. A freshman also becomes eligible for assistance from loan funds after satisfactorily completing one semester of academic work. Scholarship application blanks may be secured from the Registrar and should be filed by May 1. Part-time employment application forms may be obtained from the Director of Placement Service and filed after a candidate has been accepted for admission.

Because of the time required for preparation of studies, few students should plan to spend more than ten hours per week in part-time employment.

AID FOR UPPERCLASSMEN.—To become eligible for financial assistance, whether scholarship, loan, or part-time employment, students must file completed financial aid application forms with the Student Aid Committee in the Placement Service Office by March 1 previous to the college year for which assistance is asked.

SCHOLARSHIPS

Scholarships are awarded only to needy and deserving students of high character whose habits of life are economical and whose scholastic records are satisfactory. A limited number of these scholarships are available for entering freshmen.

Scholarships are paid in installments at the beginning of each semester in form of a credit on the student's bill. A scholarship may be discontinued at the close of any semester if the scholastic record of the recipient is unsatisfactory.

If a scholarship student withdraws from the University, any refund of University fees or charges must first be applied to reimburse the scholarship fund for the full amount of the scholarship received by the student for the semester.

The following scholarships are available:

ALVORD DAIRY SCHOLARSHIP.—for a worthy student specializing in the study of Dairy Husbandry with the intention of becoming an investigator, teacher, or special practitioner in connection with the dairy industry.

DANFORTH KEYES BANGS SCHOLARSHIP.—for the aid of industrious and deserving students.

CHI OMEGA AWARD.—The local chapter of the Chi Omega Sorority offers an annual scholarship of \$25 to that woman student

majoring in the department of economics or psychology who has the highest scholastic average at the end of the first semester of the senior year.

LUCIUS CLAPP FUND.—to provide scholarships and loans to deserving students.

THE COMMONWEALTH SCHOLARSHIPS.—The Commonwealth of Massachusetts annually provides twenty-five scholarships of not more than two hundred and fifty dollars for members of each of the four undergraduate classes of the University. Upperclass students may obtain application forms at the University placement office. Entering freshmen may obtain application forms at the Registrar's Office.

CLASS OF 1882 SCHOLARSHIP.—for the aid of a worthy student of the junior or senior class.

FREDERICK G. CRANE SCHOLARSHIPS.—for the aid of worthy undergraduate students, preference being given to residents of Berkshire County.

J. D. W. FRENCH SCHOLARSHIPS.—for deserving students in dairying and allied subjects; also Forestry.

HENRY GASSETT SCHOLARSHIP.—for a worthy undergraduate student.

CHARLES A. GLEASON SCHOLARSHIPS.—general scholarship for worthy students.

CHARLES H. HOOD DAIRY SCHOLARSHIPS.—An annual grant of \$800 for two scholarships to be awarded to seniors whose ultimate object is the operation of their own dairy farms.

LOTTA SCHOLARSHIPS.—The Trustees of the Lotta Crabtree Agricultural Fund have made available a substantial sum for scholarships. These are limited to students registered in the Schools of Agriculture and Horticulture, and Home Economics, and some Science departments. One-fourth of the amount granted is awarded to freshmen.

MARGARET F. MOTLEY SCHOLARSHIP.—one scholarship of \$100 for an upperclass student studying Horticulture, Landscape Architecture, or Floriculture.

PORTER L. NEWTON SCHOLARSHIPS.—for the aid of worthy and deserving students in the field of agriculture.

BETSEY C. PINKERTON SCHOLARSHIPS.—two general scholarships for graduates of the schools of the city of Worcester.

SEARS SCHOLARSHIPS.—The Sears Roebuck Company provides for eight scholarships of \$125.00 each which are awarded annually to deserving men students in the freshman class who desire to

major in Agriculture. This year the Sears Roebuck Company made similar grants to women students majoring in Home Economics.

WHITING STREET SCHOLARSHIPS.—Scholarships of \$50 each for deserving students.

HELEN A. WHITTIER SCHOLARSHIP.—for a deserving woman student in art as applied to living.

There are also the following special scholarships:

COTTING MEMORIAL SCHOLARSHIP.—all college expenses of freshman year—for a woman student. Recipient of this scholarship is selected by a committee of the New England Branch of the Farm and Garden Association from among candidates proposed by State Leaders of 4-H Club work in the New England states.

WILBUR H. H. WARD SCHOLARSHIPS.—Twenty-five scholarships of approximately \$100, known as the Wilbur H. H. Ward Scholarships. The Wilbur H. H. Ward Fund is administered by a Board of Trustees independent of the University. Applicants for these scholarships write to Sumner R. Parker, who may be addressed at the University. They are available only to Hampshire County boys.

THE ISOGON AWARD.—An award by Isogon, the senior women's honorary society, to a young woman student at the end of her junior year. This award is made on the basis of character and personality, scholastic achievement, campus influence and service.

GEORGE L. FARLEY SCHOLARSHIPS.—The Massachusetts Society for Promoting Agriculture has established a scholarship in memory of George L. Farley. The income of approximately \$60 per semester is awarded to deserving 4-H Club members, men or women, recommended by the State Leader of 4-H Clubs from applications submitted to County 4-H Club Agents.

ESSO 4-H SCHOLARSHIP.—Every year the Colonial Beacon Oil Company awards a scholarship of \$400.00, one-fourth of which is paid each year to a 4-H Club member enrolled in some course related to Agriculture. Selection is on the basis of need, merit, and ability. Applications should be sent to County 4-H Club Agents.

THE BORDEN COMPANY FOUNDATION.—Provides an annual Scholarship Award of \$300 to that senior student in Agriculture who has achieved the highest average grade in all college work preceding the senior year. No student whose curriculum did not include at least two courses in Dairy subjects is eligible.

NEVILLE STURGIS SCHOLARSHIPS.—The income from a trust set up under the trusteeship of DeBlois and Maddison by Neville Sturgis, of Weston, amounting to approximately \$1700 annually. This income is to be used in aiding deserving undergraduate students of the University.

ASCENSION FARM SCHOOL SCHOLARSHIPS.—The trustees of the Ascension Farm School offer annually approximately \$2400 for scholarships. These are restricted to men from Western Massachusetts who are studying in the fields of Agriculture and Horticulture.

ENGINEERING ALUMNI SCHOLARSHIPS.—Provided by annual contributions from graduates and friends of the School of Engineering to provide tuition scholarships to deserving and well-qualified students pursuing work in a major field of Engineering. They are available to freshmen.

NATIONAL ASSOCIATION OF THOROUGHbred BREEDERS SCHOLARSHIP.—A substantial award granted by the National Association of Thoroughbred Breeders to a freshman who is a member or former member of the Future Farmers of America. The award is established at various other universities as well as at the University of Massachusetts. Applications should be made to the Dean of the University.

LOANS

Through the generosity of friends of the University, funds have been donated to provide loans for a limited number of students of the three upper classes to assist in paying tuition or other college expenses. These loans are granted, after proper consideration, to needy students of good scholarship whose habits are economical. All loans are secured by a note endorsed by a responsible party as collateral. All such loans must be paid before graduation. Upon withdrawal from the University, loans automatically become due. Interest is charged at the rate of 3% to maturity, 5% thereafter on loans from all funds except the Lotta Agricultural Fund, from which loans are made without interest. Application for loans should be made to the Student Aid Committee, Placement Service Office, South College. No loan will be granted in excess of \$200 in any one year.

If funds are available at the beginning of the second semester, loans may be made in exceptional cases to members of the Freshman class whose scholastic record is satisfactory and whose budget calculations have been upset through circumstances beyond their control.

DANFORTH KEYES BANGS FUND.—This is a gift of \$6,000 from Louisa A. Baker, of Amherst, the income of which is used in aiding needy, industrious and deserving students to obtain an education at the University of Massachusetts.

LOTTA AGRICULTURAL FUND.—A limited number of loans are made to students from the income of this fund. Such loans are made without interest, but only to deserving students of high scholastic rank. This fund is administered by a Board of Trustees independent of the University, although loans are made only upon the recommendation of the President of the University.

VINCENT GOLDTHWAIT MEMORIAL LOAN FUND.—A gift of \$5,000 from Dr. Joel E. Goldthwait in memory of his son. This fund is used almost entirely for students in the Stockbridge School of Agriculture.

FRANK A. WAUGH FOUNDATION.—Graduates of the Department of Landscape Architecture and friends of Professor Frank Waugh have established this fund, to be used in part for loans to deserving seniors and fifth-year students of that department. Requests for loans shall be reviewed and approved by the head of the Department of Landscape Architecture and submitted to the Board of Trustees of the Foundation, who shall make final decision as to granting of the loans and amounts thereof.

4-H SCHOLARSHIP AND LOAN FUND.—This fund is under the supervision of the State Leader of the 4-H Clubs and is used to aid students preparing for agricultural and home economics service.

NATIONAL PEST CONTROL ASSOCIATION LOAN FUND.—A fund established by the National Pest Control Association for needy students in the field of Entomology.

THE PLACEMENT SERVICE

The University maintains a centralized Placement Service, the function of which is to assist students to secure part-time, summer, or permanent employment and to administer the required Placement Training Program.

The University is keenly interested that each graduate has an opportunity to serve his fellow men in a socially desirable occupation consistent with his interests, abilities, aptitudes, and education. To assist students to accomplish their objectives, the following aids are available: cumulative student personnel records, occupational information library, counselling and guidance in job hunting techniques, preparation of credentials and personal data sheets and personal interviews.

The Placement Service is the clearing center for all part-time jobs at the University. Students are assisted in obtaining part-time work during the college year and full-time work during the summer vacation. Employment is not guaranteed, but every effort is made to help those students who must work to meet their college expenses. In order to give assistance to as many needy students as possible, the Student Aid Committee has adopted the policy of limiting the maximum financial aid per student to the equivalent of board. The average earnings of students engaged in part-time work is approximately \$100.00 per year.

VETERANS' AFFAIRS

The Veterans' Coordinator is a member of the Placement Service.

Veterans enrolling for the first time under Public Law 346 must file a Certificate of Eligibility with the Placement Office prior to or at registration. All veterans should clear their affairs through the Placement Service.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by their local doctor is required of all entering freshmen, re-entering students and all students participating in athletics. Physical report forms for this examination will be mailed to each student with the bill for the first semester and must be completed and returned to the University Health Service not later than September 15, 1952. Evidence of a SUCCESSFUL smallpox vaccination is required.
- (2) The Student Health physicians have offices in the Physical Education Building and in the out-patient Infirmary Building, where they may be consulted during college hours.

- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by one of the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.
- (5) House calls cannot be made to dormitories, sororities, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.
- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient:
 - (a) *Nurses*.—If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service*.—If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.
 - (c) *Supplies*.—Special medical supplies prescribed by a physician will be charged to the patient.
 - (d) *Laundry*.—Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described

in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accidents and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expense and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

STUDENT HOUSING

It is the policy of the Board of Trustees that freshman men and women students shall be housed in campus dormitories and be required to eat at University dining halls unless given permission to commute. Sophomore and upper-class students will also be required to live in University dormitories in so far as accommodations are available. Those who cannot be so housed will be given permission to live in fraternity or sorority houses or in private homes.

Students who are assigned to housing operated by the University, or homes approved by the University, are expected to occupy them for the entire school year and may not be released sooner except as their places are taken by suitable substitutes.

Dormitories will be open for occupancy at 1 p.m. on the Sunday immediately preceding the opening of the University.

Students assigned to dormitory rooms will be responsible for the room rent of the entire semester. Room rent is not refundable.

Rooms are furnished except for necessary bedding and linen and are cared for by the students occupying them. Each occupant is held responsible for any damage.

All student property must be removed from the rooms and the key turned in to the Treasurer's Office immediately after final examinations in June. Such property not removed by the owner will be removed by the University and stored at the owner's expense.

The general supervision of the housing conditions of all students is in charge of the Faculty Committee on Housing.

ROOMS FOR WOMEN STUDENTS.—Dormitory rooms are available for women students at Lewis, Thatcher, Abigail Adams, Knowlton, and Hamlin Houses.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time Housemother, so that conditions in the residence halls are conducive to study and good living habits. Through the Women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Freshman girls will be assigned rooms in the dormitories and will be notified of the assignment prior to the beginning of college.

Near the close of each year, upperclass women will draw numbers to determine the order in which rooms may be chosen for the coming year.

Only students living in their own homes may commute. Upperclass women may apply to the Dean of Women for permission to live in a sorority house, or to earn room and board in a private home.

ROOMS FOR MEN STUDENTS.—Dormitory rooms are available for men students at Baker House, Mills House, Greenough, Chadbourne, and Brooks Halls, Berkshire, Plymouth, and Middlesex Houses.

All first-year men students will be assigned to campus dormitories. Upperclassmen should make dormitory room reservations at the Housing Office before May 1. Those who cannot be accommodated in dormitories will be given permission to live in fraternities or private homes. Assignment of dormitory rooms will be under the supervision of the Housing Office.

ROOMS FOR MARRIED STUDENTS.—The University cannot guarantee facilities for married students; however, those married students who can be accommodated will be housed in Federal Circle or the University Apartment Units. Assignments are under the direction of the Housing Office and all inquiries should be addressed to that office. Some students may be able to locate rooms or apartments off campus.

ADVISORY SYSTEM

In order that from the day he enrolls the freshman may have some one to whom he may go for consultation and assistance, each student is assigned to a faculty adviser at the time of registration. It is the function of this adviser to help the student in adjusting

himself to the work and life of the University. Academic progress reports issued by the Dean's Office are sent to the advisers periodically, and the students are expected to report to their advisers from time to time to discuss their academic standing. The adviser also forwards reports of academic standing to the parents. Both students and parents are encouraged to consult with the adviser whenever there are problems regarding studies or personal adjustment to college life.

At the beginning of the second semester of the freshman year each student will discuss his vocational and specialization plans with his adviser. If he can decide definitely upon the department in which he wishes to specialize, and the adviser approves, the student takes his election card to the head of that department for approval. In cases where students are not ready to designate a department of specialization they continue as general majors during the sophomore year under the direction of an adviser assigned by the head of the School in which the student is enrolled. Such general majors must select their field of specialization by the end of the sophomore year.

During the junior and senior years the student is under the guidance of the head of the department in which he is majoring or an adviser assigned by him.

RELIGIOUS LIFE

The University makes an effort to provide a wholesome and stimulating spiritual atmosphere for the students by cooperating with official agencies of the three faiths most largely represented at the University.

On the campus the religious life of Catholic students is enriched by the Newman Club, of which Father David J. Powers of Saint Brigid's Parish is chaplain; Jewish students may participate in services and activities at the local Hillel House, under the chaplaincy of Rabbi Louis Ruchames of Northampton; and Protestant students may join in worship and other religious activities conducted by the Student Christian Association, under the guidance of the Reverend Sydney Temple, chaplain to Protestant students.

The churches of Amherst provide not only the usual opportunities for worship and participation in church work, but special events for students. Students are particularly encouraged to attend Sunday service in the local church of their respective faiths.

ACADEMIC REGULATIONS

FRESHMAN WEEK

All members of the incoming freshman class are required to be in residence or attendance on the campus for the period known as Freshman Week. During this period an attempt will be made to orient the student. He will be given psychological and mental tests. Schedules and section assignments will also be arranged. In addition there will be lectures on student activities, customs, and curricula, and a scheduled meeting with the student's adviser.

REGISTRATION

Every student must report for registration on the appointed day. All late registrants must pay a \$5.00 fine. No student will be admitted to any class until he has completed the prescribed registration procedure. Changes of courses on the registration card shall be made by the Registrar's Office only.

Any student who does not complete his registration, including payment of semester charges, on the regular registration days will be required to pay a fine of five dollars.

No course will be recorded on the permanent records of the University nor will a student receive credit for it, unless such course appears on the registration card for the semester and has been properly countersigned by the instructor.

ADDING OR DROPPING COURSES

A student may not add or drop a course except with the approval of the Registrar. A course dropped without approval will be recorded as a failure.

CHANGE OF MAJOR

A student wishing to change his major must get a Program Change Card at the Registrar's Office. This change is to be approved by the head of the Department or School in which he is now majoring and also by his new major adviser. This card, properly indorsed, must be returned to the Registrar's Office before the change received final approval.

MARKING SYSTEM

All grading is done on a numerical basis with 60 per cent the passing grade. A student whose daily work in any course is en-

tirely unsatisfactory will not be permitted to take the final examination in the course and is automatically failed. If a student takes the final examination and fails to pass, the instructor may report either a condition or failure (F). To remove a condition, the student will have an opportunity to take a condition examination, or he may repeat the course. A failed course must be repeated unless permission to substitute another course is granted by the Committee on Admissions and Standards.

The scholastic record of each student is reported to his parents at the end of each semester. Mid-semester marks are sent to parents for the first semester only. A complete report of the scholarship record of each student during his first semester is sent to the principal of the school from which the student entered.

STANDARDS OF DEPORTMENT

The customary high standard of college men and women in honor, self-respect, and consideration for the rights of others constitutes the ideal of student deportment.

The privileges of the University may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the University, acting through its President or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under which they may remain in the institution. For example, if a student is not doing creditable work, he may not only be disciplined, but he may also be required to meet certain prescribed conditions in respect to his studies even though under the foregoing rules his status as student be not affected. The same provision applies equally to the matter of absences. According to the rules, juniors and seniors are allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the University authorities, a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary; moreover, it may be withdrawn as a punishment for misconduct.

Hazing in the sense of the punishment or humiliation of students is not permitted.

REQUIREMENTS FOR GRADUATION

At the beginning of his freshman year each student selects a school or division in which he will carry his major work. One of the fundamental objectives of all programs, however, regardless of School, is a general cultural education which should be the mark of every college graduate. With this end in view all candidates for the B.S. or A.B. degree must take certain required courses: English 1, 2, 25, 26; Speech 3 and 4, Economics 25; Psychology 26; and twelve semester hours of science. In addition, at least three hours must be elected from one of the following: History 5, 6, 59, 60, or Government 25.

The requirements in Physical Education must also be satisfied. All physically fit men students must take Military 1, 2, 25, and 26. A course of lectures on College Adjustments is required of women students.

Since the work of the first two years is largely directed toward a broad, general education as a foundation for the more specialized training of juniors and seniors, it follows that the program of studies for all schools is fairly uniform up to the junior year. Because of this, students can readily change from one curriculum to another, or even from one school to another as both freshmen and sophomores.

Regardless of major, students who plan to teach should register early, in their freshman year if possible, with the Department of Education, although their work there does not begin until the junior year.

The minimum requirement for graduation is 60 junior-senior credits in addition to the satisfactory completion of the required and elective work of the first two years. Except upon special permission from the Dean or Registrar, no junior or senior shall enroll for more than 17 or less than 14 credits each semester.

During the junior and senior years, each student shall complete not less than 15, and not more than 30 credits in junior-senior courses in the department in which he is specializing.

It is the policy of the University that the final forty-five semester hours of scholastic work be taken in residence. Residence, for this purpose, is defined as a period of continuous enrollment and regular attendance in classes conducted on the campus of the University.

TRANSCRIPTS

Two transcripts of a student's record will be furnished without cost. For each additional copy there will be a charge of one dollar.

CONVOCATIONS

Throughout the year each School and Division of the University conducts convocation programs which are especially designed to give students opportunities of hearing from leaders in Science, Art, Government, Education, etc. Some of the convocations are devoted to student activities such as debates, declamation contests, band and musical concerts.

STUDENT ORGANIZATIONS

One of the values received from the University course is the training acquired through participation in student activities. Student organizations offer excellent opportunities for development of leadership and broadening of outlook.

STUDENT GOVERNMENT

The student Senate, operating under the student constitution and composed of elected representatives from the student body, is the governing council of undergraduates. Its aim is to promote the general welfare of the University, and in doing so, groups of both students and faculty meet to further their mutual interests. The student Senate directs student conduct and represents the interests of the student body before the faculty.

ACADEMIC HONOR SOCIETIES

PHI KAPPA PHI.—The Massachusetts Chapter of the Honor Society of Phi Kappa Phi was installed on the campus in 1904. Its prime object is to emphasize scholarship and character. Senior students from all departments of the University are eligible for election to membership provided the scholastic and character requirements of the Society are met.

SIGMA XI.—The Society of Sigma XI is a scientific fraternity to which members are elected on the basis of outstanding scientific research. The local chapter was established in 1938.

STUDENT HONORARY SOCIETIES

ADELPHIA.—A men's Senior honorary society, recognizing men students who have been prominent in the extra curricular activities of the campus.

ISOGON.—A women's senior honorary society. Its purpose is to recognize outstanding women students on the campus.

FRATERNITIES AND SORORITIES

Social fraternities on the campus include Alpha Epsilon Pi, Alpha Gamma Rho, Kappa Sigma, Lambda Chi Alpha, Phi Sigma Kappa, Q.T.V., Sigma Alpha Epsilon, Sigma Phi Epsilon, Tau Epsilon Phi, Theta Chi and Zeta Zeta Zeta. An Inter-Fraternity council, consisting of representatives of these fraternities, has charge of rushing and all general matters dealing with fraternity life.

Sororities include Chi Omega, Kappa Alpha Theta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Delta Tau, Sigma Kappa, and Phi Delta Nu. The Pan-Hellenic Council, made up of representatives from the sororities, supervises rushing and other sorority matters.

ACADEMIC ACTIVITIES

All academic activities are supervised by the Academic Activities Board composed of alumni, faculty, and students, and find recognition in the annual award of gold and silver medals.

THE COLLEGIAN.—This is a weekly newspaper published by undergraduates.

THE QUARTERLY.—A magazine in which the literary and artistic efforts of the students are published.

INDEX.—The year book.

UNIVERSITY HANDBOOK.—Published annually as a campus book of reference.

UNIVERSITY MUSICAL ORGANIZATIONS.—Open to all students of the University. For instrumentalists: Band, Dance Band, Orchestra and Ensembles; for vocalists: Chorus, Chorale, Operetta Guild and small combinations. A Women's Drill Team performs at home games and ceremonies. The University Concert Association provides an annual series of major concerts by famous artists.

Drama is represented on the campus by the Roister Doisters, open to all four-year students interested in the art of the theater; and the University players, open to those students who have shown outstanding ability, effort, and interest in some phase of dramatics through the Roister Doisters.

INTER-COLLEGIATE ATHLETICS

The University is represented in inter-collegiate athletics by teams in all the leading sports including football, soccer, cross

country, basketball, swimming, indoor track hockey, rifle and pistol, baseball, track, tennis, and golf. General policies governing athletics are directed by the Joint Committee on the Inter-Collegiate Athletics composed of alumni, faculty, and students.

PROFESSIONAL CLUBS

There are numerous professional clubs established in connection with the various major courses of study. These clubs stimulate the students' professional interests in their chosen subject-matter fields and afford opportunity for discussion of technical subjects of mutual interest.

ALUMNI ASSOCIATION

The Associate Alumni is the general organization of the Alumni, men and women, of the University of Massachusetts. The association maintains headquarters at Memorial Hall, erected by Alumni and friends in honor of those men of the University who died in World War I.

It publishes a monthly bulletin as the alumni publication of the University and, periodically, an Alumni Directory.

The Associate Alumni strives to advance the interests and welfare of the University of Massachusetts in every way possible and cooperates in its educational work.

The organization is presently engaged in extending the facilities of Memorial Hall as a memorial to those men who died in World War II.

Under alumni sponsorship, 10 self-liquidating dormitories are being built on campus.

The governing body of the Associate Alumni consists of its officers and a Board of Directors. Four directors are elected each year and serve a term of four years. All graduating seniors become members of, and contributors to, the Association at graduation, according to a tradition set by the Class of 1940.

HONORS, PRIZES, AWARDS

SCHOLARSHIP HONORS

DEAN'S SCHOLARSHIP GROUPS.—At the beginning of each semester a list is posted of those students who during the previous semester made a general average of 80 per cent or better. Three groups are recognized: those between 90 and 100; those between 85 and 90; and those between 80 and 85.

DEPARTMENTAL HONORS.—A student who has shown outstanding promise within some department and has maintained a general scholastic average of 80 percent or better is permitted to apply for the privilege of registering for departmental honors.

If his application is accepted by his department and the Honors Committee, he is allowed to pursue a course of independent study within the department of his choice throughout his senior year. This may include intensive reading, investigation, or laboratory work in connection with some problem that he chooses for his consideration. The objective is to create initiative and the power of independent investigation, and to develop the spirit of research.

Although the student is responsible for his undertaking, he is encouraged to consult with his department in regard to his work should the need arise. At the close of his study the student presents a thesis covering his investigation. In addition he is required to appear for an oral examination. If by the excellence of his work he satisfies all the requirements of his department and the Honors Committee, his name will appear on the commencement program for receiving honors in the field of his specialization.

SCHOLASTIC PRIZES

PHI KAPPA PHI AWARD FOR SCHOLARSHIP.—Massachusetts Chapter of Phi Kappa Phi, honorary scholarship society, offers an award of \$50 for outstanding work in scholarship. This is given to some member of the senior class at the opening of school in the fall. The award is based on the record of the first three years.

THE BURNHAM PRIZES.—These were made possible through the generosity of Mr. T. O. H. P. Burnham, of Boston. Prizes of \$15 and \$10 are awarded to those students delivering the best and second best declamations respectively in the Burnham contest. The preliminary contests are open under certain restrictions to freshmen and sophomores.

THE FLINT PRIZES.—The Flint Oratorical Contest was established in 1881 by a gift of the late Charles L. Flint, a former president of the College. After his death the prizes were continued by college appropriation. Prizes of \$30 and \$15 are awarded as first and second prizes respectively to those two students delivering the best orations in this contest.

THE HILLS BOTANICAL PRIZE.—This is given through the generosity of Henry F. and Leonard M. Hills, of Amherst, for the first and second best herbaria. Competition is open to mem-

bers of the senior, junior and sophomore classes. First prize is \$20, second prize, \$15.

THE BETTY STEINBUGLER PRIZE IN ENGLISH.—This prize was endowed by John L. Steinbugler, of New York City, in honor of his daughter Elizabeth Steinbugler Robertson, a graduate of this College in 1929. It is awarded to a woman in the junior or senior class who has written the best long paper on a subject of literary investigation in a course in English during the year.

MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE PRIZES.—Three prizes of \$25, \$15, and \$10 are awarded to those senior students who are judged to have made the best records in the theoretical and practical work in agriculture required in their course of study, and in the special written and oral examination prepared for this award.

ATHLETIC AND ACADEMIC PRIZES

THE ALLAN LEON POND MEMORIAL MEDAL.—This medal is awarded for general excellence in football, in memory of Allan Leon Pond, of the class of 1920, who died February 26, 1920. He was a congenial companion, a devoted lover of The Alma Mater, a veteran of World War I, a fine all-round athlete and a true amateur. He would rather win than lose, but he would rather play fair than win. He has been characterized as a typical student of the University.

THE WILLIAM T. EVANS MEMORIAL TROPHY.—This trophy is given each year to that member of the varsity football team who through his sportsmanship, football ability, character and personality has thus exemplified the character and spirit of the person in whose memory this memorial trophy is dedicated. The trophy is dedicated to the memory of William T. Evans, a former member of the class of 1942, who died December 9, 1941. This trophy is presented annually by the class of 1942.

THE THOMAS E. MINKSTEIN MEMORIAL AWARD.—This award is made by the class of 1931 in memory of their classmate who died July 16, 1930, while he was captain-elect of football. The award is given to one of the outstanding men in the junior class who has as nearly as possible attained those standards of athletics, scholarship and leadership set by him whose memory this award honors.

THE GEORGE HENRY RICHARDS MEMORIAL CUP.—This cup is awarded annually to the member of the basketball team who shows the greatest improvement in leadership, sportsmanship,

and individual and team play during the year. It is in memory of George Henry Richards, of the Class of 1921, who died suddenly while a student at the College.

THE JOSEPH LOJKO MEMORIAL PLAQUE.—This plaque is presented to a senior who must be a letter man, have a satisfactory scholastic record, and show those qualities of enthusiasm and cooperation which make for leadership. It is awarded in honor of Joseph Lojko, of the Class of 1934, an outstanding athlete who died while a senior in college.

THE SAMUEL B. SAMUELS BASKETBALL CUP.—This cup is presented annually in the name of Samuel B. Samuels, of the Class of 1925, who was an outstanding basketball player during the early years of basketball as a varsity sport at the University. The trophy is awarded to that letter man who is a regular member of the varsity basketball team and who has performed with excellence during scheduled varsity games.

THE E. JOSEPH THOMPSON MEMORIAL TROPHY.—This baseball trophy is given by Thomas Thompson in memory of his brother, E. Joseph Thompson, who graduated from Massachusetts State College in 1932. He was president of the student Senate, a varsity letter man in football and baseball, and an outstanding campus citizen. The award goes to that member of the varsity baseball team who best exemplifies the best characteristics of the sport each year.

ACADEMICS CONSPICUOUS SERVICE TROPHY.—This trophy is awarded annually to that student who has made the most unique contribution to the academic activities during the year.

ACADEMIC MANAGER'S PRIZE.—Fifty dollars is awarded annually to that Academics manager who fulfills his routine duties most efficiently.

MILITARY HONORS AND AWARDS

Competed for yearly and presented at the Final Military Review

DESIGNATION OF DISTINGUISHED MILITARY GRADUATES

THE SONS OF THE LOYAL LEGION TROPHY.—Awarded annually by the Massachusetts Chapter of the Sons of the Loyal Legion to the Senior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a plaque and a

sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

THE MILITARY DEPARTMENT TROPHY.—Awarded annually by the Military Department, University of Massachusetts, to the Junior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a sterling silver goblet and is given to the individual to keep in his permanent possession.

THE AIR FORCE ASSOCIATION MEDAL.—Awarded by the Air Force Association to the outstanding Air ROTC cadet in the First Year Advanced Course. This award is based on academic and military scholarship grades and individual characteristics of leadership.

THE ELIZABETH L. McNAMARA TROPHY.—Awarded annually by Mrs. Elizabeth L. McNamara, a trustee of the University for many years, to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a permanent plaque with winner's name inscribed thereon.

THE JOHN C. HALL TROPHY.—Awarded annually to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a loving cup donated by the class of '02 with the winner's name inscribed thereon, and a sterling silver goblet, awarded by Mr. John C. Hall, is given to the individual to keep in his permanent possession.

THE AMHERST ROTARY CLUB TROPHY.—Awarded annually by the Amherst Rotary Club to the cadet ranking No. 1 in scholarship and military efficiency in the first year basic course. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

QUALIFICATION BADGES U. S. ARMY.—Awarded to cadets who have qualified with the necessary scores with either Rifle or Pistol.

DISTINGUISHED MILITARY GRADUATE.—Each year the USA and USAF appoint cadets to the regular Army and Air Force from a group of Distinguished Military Graduates who have been selected by the Military Department. These cadets are chosen on the basis of outstanding qualities of Military Leadership and Scholarship which have been displayed during the Advanced Course R.O.T.C.

ADMISSION TO THE UNDERGRADUATE COLLEGE

Those interested in applying for admission to the University of Massachusetts should write to the Registrar to obtain an application form. The first two pages of the application form are completed by the candidate himself. The last two are completed by high school or preparatory school authorities, who mail the application form directly to the Registrar of the University.

Because of the increasing interest in college level study and the consequent increase in the number of applications, candidates are advised to file their applications early in the senior year of high school and certainly not later than March 1 of the year in which they plan to enter.

Preference is given to residents of Massachusetts, but the University also admits students from other states. A few students from foreign nations are also admitted. Candidates for the freshman class are accepted only for the opening of the college year in September. Students enrolled in other colleges may apply for admission to the Summer Session, but admission to the Summer Session does not necessarily constitute regular admission and enrollment in the undergraduate program of the University.

The University admits young men and women to the freshman class chiefly on the basis of character and scholarship. The general record must indicate promise of success and ability to profit by the opportunities which the University has to offer. Due regard is given to special achievement in specified subject matter fields.

SUBJECT REQUIREMENTS FOR ADMISSION

The subjects of preparatory study required for admission call for the satisfactory completion of a four-year high school course, or its equivalent, and are stated in terms of units. A unit is the equivalent of at least four recitations a week for a school year. High school graduation alone is not sufficient. The applicant's record must indicate capacity for handling the quality of scholastic work which the University has established as its standard of achievement.

Sixteen units of secondary school work must be offered, selected according to the following requirements:

Algebra	1½
Plane Geometry	1
English	4
Foreign Language (2 years of 1 language)	2
U. S. History	1

The remaining units are elective and may be selected from the following subject matter:

- a. Mathematics
- b. Science
- c. Foreign Language
- d. History and Social Studies
- e. Free electives (not more than four units)

Free elective subjects are those not included in groups a-d, as for example: Music, Art, Drawing, Typewriting, Aeronautics, Agriculture, Home Economics, etc. Such free electives are allowed in order that the student who wishes may have some opportunity to elect other high school courses, while at the same time covering the fundamental requirements for college work.

Students planning to pursue an engineering curriculum should offer two years of Algebra, one of Plane Geometry, and one-half year each of Trigonometry and Solid Geometry. Chemistry and Physics are also advised. Those deficient in the Mathematics should plan to cover it during the summer prior to entrance or expect to take five years to complete the college course.

In high schools organizing agricultural club work under the supervision and rules of the Junior Extension Service of the University, one credit is granted for each full year of work approved by the State Leaders.

Candidates of exceptional ability and promise may be considered for admission even though some of the prescribed courses were not included in their high school program.

METHODS OF ADMISSION

Plan A. Students applying from accredited schools and making the college recommendation grades of their school in accordance with the subject requirements listed above are considered certified for admission.

Superior graduates of Vocational Schools of Agriculture in Massachusetts and Vocational Agricultural Departments in Massachusetts High Schools may be accepted for the Degree of Bachelor of Vocational Agriculture provided:

a. They are unqualifiedly recommended by the Vocational Division of the Department of Education as bona fide Vocational Graduates with superior ranks; and

b. They can present at least 16 units of certified entrance credits, approved as to quality and quantity by the State Department of Vocational Education.

Plan B. Students who are not fully certified will be required to take the Scholastic Aptitude test of the College Entrance Examination Board. In some cases three Achievement Tests will be required also. The applicant will be informed what tests are to be taken as soon as his application is received or at the time of his personal interview. Candidates will ordinarily take these examinations in the spring of their senior year. Application blanks and a bulletin of general information concerning the tests may be obtained from the College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey.

The University realizes that although almost all students will qualify under either Plan A or B, there will be a few promising candidates who, for one reason or another, are unable to meet fully the subject requirements for enrollment. Such applicants are requested to present their individual problems to the Registrar in order that the Admissions Committee may outline for them what must be done to qualify for enrollment.

ADMISSION TO ADVANCED STANDING

A limited number of students from approved colleges may be admitted on transfer to advanced standing. Since applicants for such admission usually exceed the number that can be accepted, they are placed on a competitive basis. Acceptance will thus depend upon recommendations and quality of record.

Candidates desiring to transfer to the University of Massachusetts from other institutions should write to the Registrar for a regular application form, inasmuch as a student applying for transfer must first of all be able to meet the entrance requirements of the University. Such candidates should also submit the following:

a. A letter outlining reasons for wishing to transfer and describing briefly the type of major work to be followed if accepted for admission.

b. An official transcript of entrance credits and college record to be sent by the Registrar of the College from which he wishes

to transfer. This should be forwarded as soon as possible after the close of the semester preceding the one for which transfer is sought.

At least forty-five semester hours of work in residence are required of any transfer student desiring to be recommended for the Bachelor's degree.

UNDERGRADUATE CURRICULA

Undergraduate instruction is organized into a College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, and Home Economics, and a Division of Physical Education for men.

This section of the catalogue deals with the opportunities for study and the curricula available in each of these departments of the University.

COLLEGE OF ARTS AND SCIENCES

_____, *Dean*

The College of Arts and Sciences includes the usual subject matter departments in which are offered the courses in general education essential for enlightened citizenship and later specialized and professional training. Most of the courses in the common prescribed curriculum for all freshman and sophomore students, regardless of their field of specialization, are taught in the College.

Each department offers the usual requirements of undergraduate specialization in its particular field. In addition, special curricula are provided to meet the needs of special groups of students. These include curricula for pre-medical, pre-dental, and pre-veterinary students; for those who plan to train as laboratory technicians and to enter the public health service; and for those interested in social work.

CURRICULA IN ARTS AND SCIENCES

The work of the first two years is largely prescribed, specialization occurring in the junior and senior years. The concentration of the junior and senior years gives the students as high a proficiency in their fields of specialization as is possible without sacrificing the objectives and requirements of a well-rounded education. The curriculum for the first two years follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
English 1	2	English 2	2
Speech 3	1	Speech 4	1
Math. 7 or 5	3-4	Math. 8 or 10 or 6	3-4
² Zoology 1 or Botany 1	3	² Botany 1 or Zoology 1	3
Foreign Language	3	Foreign Language	3
¹ Elective	3	¹ Elective	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

²Those not majoring in science departments may take Chemistry 1 and 2 in place of Zoology 1 and Botany 1, or substitute Geology 27 for either Botany 1 or Zoology 1.

¹Those majoring in science departments take Chemistry 1 and 2 (or 4); those in non-science departments take History 5 and 6.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
English 25	3	English 26	3
Psychology 26 or Economics 25	3	Economics 25 or Psychology 26	3
¹ Science	3-4	¹ Science	3-4
¹² electives	6-7	¹² electives	6-7
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ In selecting the required science course and the two electives, students should be guided by the recommendations for sophomore work given under the descriptions of junior-senior curricula that follow.

JUNIOR-SENIOR CURRICULA IN ARTS AND SCIENCES

Major work is available in the following departments during the last two years.

BACTERIOLOGY AND PUBLIC HEALTH

The department offers three curricula: one in Bacteriology, one in Public Health, and the other in Medical Technology.

BACTERIOLOGY

L. A. BRADLEY, *Adviser*

The courses in bacteriology have been planned to furnish (1) a general training in this field for college students; (2) specialization for those contemplating a professional career in bacteriology.

Majors in bacteriology should elect the following in the sophomore year: Chemistry 29, 30; Physics 25, 26; Bacteriology 31, 31A; Zoology 35. The physics may be deferred until the junior year to allow for additional language study.

Juniors and seniors must take Chemistry 51, 52, and 79; and Botany 66 and Zoology 84 in addition to the required work in Bacteriology and Public Health.

PUBLIC HEALTH

L. A. BRADLEY, *Adviser*

Through the cooperation of several departments of the university and the Massachusetts Department of Public Health, curricula are provided for (1) a limited number of students interested in the many phases of public health service for which graduate work in medical or engineering schools is not essential; and (2) students planning graduate work in sanitary engineering.

Particular attention will be given to the training of sanitarians, district sanitary officers, food and milk inspectors, water and sewage treatment plant operators, technicians for public health laboratories, and agents for local boards of health. Students planning graduate work in sanitary engineering must also take Mathematics 29 and 30 (calculus) before the end of their junior year.

The following curriculum is required of all upperclassmen:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Public Health 62, Sanitation	3
Public Health 61 Sanitation	3	Bacteriology 90, Sanitary	3
Chemistry 31 or 51, Organic	3-4	Chemistry 32 or 52, Organic	3-4
*Electives	6	*Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agr. Econ. 79, Statistics	3	Public Health 86, Field	
Public Health 84, Administration	3	Studies in Sanitation	3
*Electives	9	Public Health 88, Epidemiology	
		Communicable Disease	
		Control	3
		*Electives	10

* During the junior-senior years, students elect a minimum of 24 semester credits from the following:

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Hus. 53, Elements of Meat		Bact. 82, Food	3
Packing	3	Public Health 64, Planktology	3
Chem. 63, Water and Sewerage	3	Bot. 66, Industrial Mycology	3
Govt. 61, Public Administration	3	Dairy Ind. 52, Market Milk	4
Mech. Engineering 1, Drawing	3	Govt. 62, Public Administration	3
Civil Engineering 77, Water		Civil Engin. 78, Sewerage	3
Supply	3	Ent. 60, Pest Control	3
Food Tech. 75, Food Preservation	3	Ent. 74, Medical Ent.	3
Forestry 51, Management of		Food Tech. 92, Food Analysis	3
Water Sheds	3	Home Ec. 52, Nutrition	3
Geol. 27, Physical Geology	3		
Vet. Sci. 78, Pathology	3		
Zool. 69, Parasitology	3		

CURRICULUM IN MEDICAL TECHNOLOGY

R. L. FRANCE, *Adviser*

This curriculum provides a broad fundamental training for young women who plan to qualify as medical technologists. The program more than meets the basic collegiate requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists.

Through an agreement between the Bingham-Rockefeller laboratories and the university, each year a certain number of graduates of the course will be accepted as technicians in laboratories supervised by the Bingham-Rockefeller foundation. There the technicians will receive further theoretical and practical training so that after a year they will be qualified to take the examination for the Certificate of Medical Technologist. A satisfactory living salary is paid the technician during the year of training and unusual opportunities for advancement are offered.

Also, through the cooperation of the Bingham-Rockefeller laboratories, the university placement service, and the department of bacteriology and public health, graduates other than those accepted by the Bingham-Rockefeller foundation will be placed in laboratories certified by the American Society of Clinical Pathologists as qualified to train medical technologists.

Students taking this curriculum should complete the following sciences in the sophomore year: Bacteriology 31A; Chemistry 29, 30; and Zoology 35.

The junior-senior program follows:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Bacteriology 52, Advanced	3
Chemistry 31 or 51, Organic	3-4	Chemistry 32 or 52, Organic	3-4
Public Health 61, Sanitation	3	Public Health 62, Sanitation or	
Zoology 51, Microtechnique	3	Public Health 88, Commu-	
*Electives	3	nicable disease control	3
		*Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 81, Applied	4	Bacteriology 82, Applied	3
Bacteriology 85, Serology,		Bacteriology 92, Clinical	3
Immunology	3	Chemistry 80, Clinical	3
Zoology 69, Medical parasitology	3	*Electives	6
*Electives	6		

* During the junior-senior years students elect 21 credits from the following:

History, required course
Chemistry 79, Physiological
Chemistry 82, Qualitative organic

Zoology
Physics 25, 26 Introductory
Liberal Arts

BOTANY

T. T. KOZLOWSKI, *Adviser*

The purpose of the courses in botany is primarily to provide a thorough background for specialization in the science, and secondarily to support and supplement the work of other fields in which knowledge of plant life is held to be important. Certain courses should likewise prove of interest and value to the general student.

Those who wish to specialize in botany will find here an ample field and an adequate opportunity for advanced undergraduate study. Post-graduate training, often with provision for financial aid, is available in most graduate institutions, and many teaching, research and industrial positions in schools, and colleges, experiment stations, federal and state services and private enterprise are open to the trained botanist.

The curriculum offers to the student an opportunity to acquire either a broad general knowledge of botany, or to devote himself to more extensive study in one of the major divisions of the science, such as plant morphology and taxonomy, plant physiology, mycology and plant pathology. Under the direction of his adviser each student selects a program of courses in botany and other sciences, humanities and arts which seems best adapted to his particular botanical objectives.

Specialization in botany assumes the satisfactory completion of certain basic and supporting courses prior to the junior year. These include Botany 1, 25 and 26; Chemistry 1, 2 and 29; and a modern language. Two years of German are advised.

The junior-senior program requires that courses in botany to the amount of 15-30 credits be chosen under the guidance of the adviser. He will also make recommendations in regard to electives.

CHEMISTRY AND CHEMICAL ENGINEERING

CHEMISTRY

W. S. RITCHIE, *Adviser*

The objectives in chemistry are to give the student an understanding of the subject which will enable him to appreciate the relation of chemistry to other sciences, and to industry, and to provide training for those who intend to become teachers and workers in the allied sciences, and for those who wish to go on to graduate study and a professional career in chemistry. Completion of the

course in chemistry fits the student for positions in the chemical industries and related fields as well as in the agricultural industry, for employment in state and Federal agricultural experiment stations and commercial laboratories and for teaching.

Students planning to major in chemistry should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 29, 30; and Physics 25, 26.

Work for the junior and senior years includes required courses in analytical, organic, and physical chemistry and the possibility of election in related and supporting fields. While the major is arranged to provide general and fundamental training in the science, work in the humanities and social sciences is also recommended. The desirability and necessity of a well-rounded education must not be overlooked.

CHEMICAL ENGINEERING

E. E. LINDSEY, *Adviser*

The courses in chemical engineering are designed to give the student a good background and thorough understanding of chemical engineering principles. The student studies the fundamental principles first and then proceeds to apply them in the solution of comprehensive problems and in the use and operation of pilot plant sized equipment.

Students planning to major in chemical engineering should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 31, 32; Physics 25, 26; and Civil Engineering 34.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Chemistry 65, Physical	4	Chemistry 66, Physical	4
Chem. Engin. 57, Inorg. Tech.	3	Chem. Engin. 60, Heat-Energy	3
Chem. Engin. 55, Calculations	3	Chem. Engin. 56, Unit Operations I	3
Civil Engin. 53, Strength of Materials	3	Professional elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. Engin. 93, Comp. Prob.	3	Chem. Engin. 76, Abstracts	2
Chem. Engin. 97, Unit Ops. II	3	Chem. Engin. 94, Comp. Prob. II	4
Elec. Engin. 63, Elements	3	Chem. Engin. 98, Adv. Unit Ops.	2
Professional electives	5	Elec. Engin. 65, Electronics	3
History	3	Professional elective	3-4
		Economics 25 or Psychology 26	3

ECONOMICS

P. L. GAMBLE, *Adviser*

In Economics the aims are twofold: (1) to give the student an understanding of economic theory and of the application of economics to the organization of society; (2) to provide students with the elementary training necessary for further study of economic and business problems.

The department requires that all majors irrespective of the career desired take the following courses: Economics 73, 79, Finance 53, Accounting 25, and Agricultural Economics 79 or Mathematics 62. In addition, each student must select an additional 12 credit hours of work from the Economics curriculum. No major student is permitted to take more than 36 junior-senior credit hours of economics, agricultural economics and business administration courses. In choosing elective courses students are urged to select courses in the humanities and preferably some from the allied fields of history, philosophy, psychology, and sociology. Those intending to major in Economics should elect Economics 26 in the sophomore year.

For the majors in the Economics department, there are offered courses which may be combined to serve as preparation toward a number of different careers. Among others, possible careers in the following fields are open:

Banking and Finance	Public Utilities
Government Service	Social Security
International Trade	Statistics
Labor and Personnel Relations	Transportation and Communication

EDUCATION

A. W. PURVIS, *Adviser*

The department seeks to utilize the forces of the university to prepare teachers for secondary schools and through its graduate offering to prepare administrators and specialists in the various phases of public education. Its teacher-training program is based upon the assumption that secondary school teachers should have a broad liberal education, considerable mastery of the subject or group of subjects to be taught, and professional courses which should lead to a knowledge of the pupils to be taught, familiarity with the problems to be met, and new meaning to the subjects of instruction.

In order to realize these aims, all students who contemplate teaching or other school work as a career should register early, in their freshman year if possible, with the Department of Education although their work there does not begin until the junior year. Admission to either a minor or a major in Education will be determined largely by a composite rating based on scholarship as determined by university grades and success in the beginning course in History of Education, on the percentile rank of standard placement tests, and on personality ratings by members of the staff.

Currently there are two avenues leading toward a career of teaching in the secondary schools. The student may (1) major in Education or (2) minor in Education and major in subject-matter field to be taught.

THE MAJOR IN EDUCATION. This opportunity is intended for those students who desire to teach in one or more fields and who are seeking (1) a more diversified program than is possible under a subject-matter major and (2) a much wider opportunity to do practice teaching. Normally the student in his four years will schedule approximately thirty hours in one subject field, eighteen in a second subject field and eighteen in Education. The remaining hours will be distributed among supporting courses and courses in general education. The student should register early, in the freshman year, if possible, in the Department of Education and should apply for the major in Education at the end of the sophomore year. He should elect History of Education 51 in the first semester of the junior year and candidates will be chosen for the major during that semester.

The following general outlines are given as examples of how the major in Education would apply to various teaching programs.

TEACHING ENGLISH AND HISTORY

First and second years—satisfy requirements of the College of Arts and Sciences; elect Government 25, History 31, 32.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. English 18 hours, History 6 hours, general 18-21 hours.

TEACHING MATHEMATICS AND PHYSICS

First and second years—satisfy requirements of the College of Arts and Sciences; elect Mathematics 29, 30, Physics 25, 26.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. Mathematics 12 hours, Physics 12 hours, general 18-21 hours.

TEACHING CHEMISTRY AND BIOLOGY

First and second years—satisfy requirements of the College of Arts and Sciences; elect Chemistry 29, 30, Mathematics 29, 30, Botany 25, 26.

Third and fourth years—Education 51, 52, 53, 83, 85, 88. Chemistry 15 hours, Botany, Zoology 12 hours, general 15-18 hours.

THE MINOR IN EDUCATION. Training programs for students who desire to teach and to major in any of the arts and sciences or in agriculture, home economics, physical education, or extension are as follows:

TEACHER-TRAINING IN THE ARTS AND SCIENCES. The student should register early in the Department of Education and should usually elect prerequisite course, History of Education 51, in the first semester of the junior year. If the student is then accepted for a minor in Education he will normally take Education 52 and 88 in the second semester of the junior year, Education 53 and 83 in the first semester of the senior year and Education 85 in the last semester of the senior year. Opportunity for a restricted amount of practice teaching is available under Education 85 if the student's schedule permits. (Tuesday and Thursday should be free for this work.) A selected few from this group may be chosen each year for the One-Semester Plan if it is offered.

TEACHER-TRAINING IN AGRICULTURE. (Professor Oliver, adviser.) By a cooperative agreement with the State Division of Vocational Education, persons otherwise qualified may prepare to teach vocational agriculture by the satisfactory completion of Education 72, 73, and 75. Education 52 is also recommended. To insure a desirable range of preparation, students who contemplate vocational teaching should consult (early in the freshman year if possible) Professor Oliver and the State Supervisor of Agricultural Teacher-Training. A vocational teacher-training certificate is awarded by the Vocational Division to those who fully qualify.

TEACHER-TRAINING IN HOME ECONOMICS. (Professor Piatt, adviser.) These students will major in home economics and elect Education 51, 53, and 83, Home Economics 81 and 83, Psychology 55. A selected few may be chosen each year for the One-Semester Plan.

TEACHER-TRAINING IN PHYSICAL EDUCATION. (Professor Gore, adviser.) These students will major in physical education and elect at least eighteen hours of the academic field to be taught. They should elect Education 51, 52, 85, and 88, Physical Education 54, Psychology 55.

TEACHER-TRAINING IN EXTENSION. (Mr. Dayton, adviser.)

The student will major in some branch of agriculture, horticulture (see page 108) or home economics (see page 135) and should elect courses in economics, speech, and journalism. They should elect Education 79 and 66.

ENGLISH

F. P. RAND, *Adviser*

The department of English offers courses in English composition and literature and in speech. Students majoring in this department must conform to the institutional and school requirements for freshman and sophomore years, and in choosing sophomore electives should include two semesters of modern language and one semester of English history.

The courses in English are intended to enable students to express themselves effectively and to appreciate humanistic values and the ideals of English-speaking people throughout their history. They also offer an appropriate, and in some instances an adequate, classroom training for work in such fields as teaching, authorship and editing.

The student must earn 30 credits in elective courses in English. However, for six of these he may substitute elective courses in technical writing, other languages or speech.

JOURNALISM

The journalism courses are designed to provide professional guidance for students interested in newspaper work or related fields. Such students are advised to compete for membership on the college newspaper while freshmen or sophomores, take the introductory course (Journalism 85) as juniors, and elect other courses in social science and literature. Selected seniors will be provided a limited amount of actual professional experience.

ENTOMOLOGY

C. P. ALEXANDER, *Adviser*

Courses in entomology serve a variety of functions, such as to give students a broad knowledge of insects, particularly in their relations to man, his crops, his animals, and his health. Students are trained to become entomologists in the service of the United States, or in various state, territorial, or foreign services. Special emphasis is now placed on medical entomology in conjunction with the armed forces at home and abroad. Other fields of training

include forest entomology; control of pests in buildings; research, technical service or sales work with manufacturers of insecticides; teachers of zoology, particularly entomology, at the university level; and various other branches.

The courses in beekeeping are offered with the following aims: (1) to meet the increase in vocational opportunities for the production of bees or honey as a business; (2) to study the beekeeping needs of fruit and truck-crop industries and the part that bees play in the pollination of flowers; (3) to acquaint the student with a recreational field that can be made profitable.

Majors are required to take Entomology 26 in the sophomore year. Strongly recommended sophomore subjects include Botany 25, 26; Zoology 25; Chemistry 29, 30; Zoology 35; and either French or German, or both.

Juniors and seniors should support their work in entomology with the following courses: Botany 51, 52; Bacteriology 61, 62; Chemistry 51, 52; Zoology 51, 69, 70; Pomology 56; English 84; and selected courses in education, floriculture, forestry, horticulture, and other subjects.

FINE ARTS

D. ALVIANI, *Adviser*

The department of fine arts is to a certain extent interdepartmental and interscholastic, including that work of various departments which is artistic in their contributed courses. For the present the aim of the department is to bring together art, music and other courses in self-expression until the growth of the work permits the development of several special departments. The work in art is basic in its approach to design, drawing and painting. The art appreciation courses are non-professional in scope but provide a better understanding of the arts, in history and quality. The courses in music furnish an understanding of the history and interpretation of music, provide basic professional theory and afford some opportunities for performance. In addition, the department has made arrangements with well-qualified private teachers to offer instruction, without course credit, in voice and instrumental music to individuals or class groups.

The student majoring in fine arts is required to elect not less than 28 nor more than 30 credits from among the courses listed

below. At least 15 credits must be from Group A or from Group B, and the student's adviser is assigned on this basis.

A	B	C
Music 25, 26, 27, 28, 29, 30	Art 33, 34	Home Ec. 31
Music 51, 52	Art 27, 28	Psych. 56, 62
Music 61, 62	Art 31	Hist. 53, 69, 72
Music 75, 76	Art 75	Govt. 28
Speech 89	Land Arch. 84	Phil. 82
Journalism 85	Art 77, 78	Physics 60
	Home Ec. 26	Engl. 68, 74, 77, 84
		Soc. 28
		Ed. 51, 52, 53, 66, 94
		Bus. Law 70
		Marketing 54
		Speech 91

GEOLOGY AND MINERALOGY

L. R. WILSON, *Adviser*

The offerings in geology and mineralogy are intended chiefly for those who wish to gain some acquaintance with one or more branches of earth science. For the general student prerequisite requirements are reduced to a minimum. A program of moderate specialization may be provided for science majors who are interested in geology.

To major in geology a student must complete thirty credit hours of work in the department. Those who have completed nine or more credits in geology in addition to the sophomore courses by the end of the junior year, and who wish to satisfy major requirements for graduation in the field of geology, will be given individual or group problems in the senior year. The nature of the work will depend upon student interest and preparation. In any junior or senior course in geology an additional period per week without credit may be required of students who specialize in this field. Chemistry through qualitative analysis and a year's work in college physics represent minimum requirements in these respective fields for undergraduate specialization in physical geology. For those interested in pursuing studies in stratigraphy or paleontology, work beyond the freshman year in the systematic aspects of both botany and zoology is essential for satisfactory progress,

GERMAN

F. C. ELLERT, *Adviser*

The courses in German are intended to give a practical knowledge of the language for the purpose of wider reading, research, and oral communication.

During the junior and senior years each student will complete not less than 24 and not more than 30 credits in the junior-senior German courses. Students planning to use the language professionally are also urged to supplement their courses here with a summer session at an approved school of German.

HISTORY AND GOVERNMENT

HISTORY

T. C. CALDWELL, *Adviser*

The courses in history are intended to impart an understanding of the people of the world and their problems through an analysis of man's development in the past. A major in this field should provide the student with a broad cultural background and a basis for good citizenship. History may have special value for the following groups:

- (1) Those who plan to teach history or the social studies.
- (2) Those who plan careers in which considerable knowledge of history is desirable. These might be in fields such as law, government service, journalism, and library work.

Students who wish to major in this department are expected to conform to the institutional and divisional requirements of the freshman and sophomore years, including History 5 and 6. In choosing sophomore electives they should include two semester courses in history.

In addition to the above courses, students are expected to take a minimum of 24 credits in the elective junior and senior courses. Government 25 should be elected in the junior year if not taken as a sophomore elective. History 59 and 60, American History, and History 91 and 92, Historical Bibliography are required.

GOVERNMENT

W. A. MITCHELL, *Adviser*

The work in government aims to give the student an understanding of the principles of government and their application to the organization of society, and to provide him with elementary training necessary for positions in government service or further study on the graduate level. It thus may be considered either as

pre-law or pre-professional work, in addition to its general cultural utility.

Majors in the field should elect Government 25 and 28 in their sophomore year. In the junior and senior years a minimum of eight additional courses in government is recommended; these may be elected from the following: Government 52, 61, 62, 63, 64, 65, 66, 67, 68, 93, 94, or History 53. In addition eight supporting courses in other social sciences are recommended; these may be chosen from the fields of history, economics, sociology, or psychology. The remaining junior-senior courses should be chosen from the fields of languages, literature, philosophy, art, or music.

MATHEMATICS

A. E. ANDERSEN, *Adviser*

The department offers courses designed to furnish a cultural background as well as a foundation for both undergraduate and graduate work in such fields of science as physics and chemistry, in engineering and in other technical subjects.

The courses recommended for majors in the department are designed to prepare students for high school teaching, graduate study in mathematics, actuarial work, statistical work, or work as engineering aides.

All majors are required to take Mathematics 29 and 30 and Physics 25 and 26 in the sophomore year. In the junior and senior years each major must take Mathematics 65, 91, and 92 and must, in addition, complete at least 15 credits in the following courses: Mathematics 51, 55, 60, 62, 66, 71, 72, and 94.

PHILOSOPHY

H. N. GLICK, *Adviser*

Philosophy in general attempts to offer a comprehensive understanding of the universe and makes an effort to decide what one should do while living in it. The distinctive purpose of the courses in philosophy is to concentrate on methods of inquiry, standards of thought, search for values in personal and community life, and the analysis of artistic expression and standards of criticism.

The student majoring in this subject will complete a minimum of 21 credits in junior-senior courses in philosophy. A wide range of supplementary courses is advised, among which the following are acceptable: Chemistry 88, Government 66, 71, 72, Education 51, English 51, 74, 79, 80, Art 75, 77, 78, Music 51, 52, History

77, 78, Mathematics 72, Psychology 61, 90, French 51, 52, Sociology 53, 82.

PHYSICS

W. F. POWERS, *Adviser*

The physics courses give opportunity for the study of basic physical laws and phenomena of nature. From these courses students may make a selection to satisfy a major in physics, or to comply with requirements for graduate study.

Majors must take Physics 25, 26 and Mathematics 29, 30 in the sophomore year. Juniors and seniors are advised to support their physics major courses by electives in mathematics, such as differential equations, vector analysis, and chemistry 31, 32. Since the interests of major students vary, the department advisers will be glad to make suggestions regarding programs of study.

PSYCHOLOGY

C. C. NEET, *Adviser*

The courses in the psychology department are designed (1) to impart an understanding of behavior and the application of this knowledge to problems of human adjustment; and (2) to give preparation for professional work in psychology and related fields.

Careers open to psychology majors include: teaching and research, guidance, psychometrics, personnel and industrial work, child welfare, abnormal and clinical psychology, opinion polling, and government service. Additional training is required for certain of these careers.

Students planning to major in psychology should elect Psychology 26 and Psychology 28 in the sophomore year. In the junior and senior years majors are advised to take a minimum of 24 credits in psychology. Courses 51 and 90 are required. As broad a cultural background as major programs will permit is advised.

Majors planning careers primarily in experimental and physiological psychology should plan to take one or more courses during their four years in chemistry, mathematics, physics, and zoology. Those planning careers in abnormal and clinical psychology and in child welfare should elect specified courses in education, English, home economics, sociology, and zoology; while those planning careers in psychometrics, guidance, personnel and industrial work, and government service should take certain courses in business administration, in economics, education, industrial engineering, and sociology.

ROMANCE LANGUAGES

Two curricula are offered: French and Modern Languages.

FRENCH

C. F. FRAKER, S. C. GODING, *Advisers*

The courses in French are intended to give a rounded knowledge of the language for the purpose of wider reading, oral communication and research, leading to a better understanding of the art and the science of the nation. Students majoring in French are required to earn 30 junior-senior credits in the department. Those preparing to use the language professionally are usually urged to supplement their courses here with a summer in an approved school of language.

MODERN LANGUAGES

C. F. FRAKER, *Adviser*

This is a distributed major. The requirements are 30 credits in modern languages, including at least 12 in advanced courses in one of them, and not including the 12 required of freshmen and sophomores.

SOCIOLOGY

J. H. KORSON, *Adviser*

The courses in sociology are planned with two aims in view:

(1) To give the student an understanding of the factors which influence men in their activities and interests as members of society, and

(2) To prepare those students who are interested in teaching social studies at the high school level; or those students interested in careers with government agencies; or in careers as social workers with state or private agencies to gain the pre-professional courses necessary before embarking on such careers. Most agencies require some work on the graduate level before full-time employment is obtained, while others offer in-training opportunities to graduate majors in sociology.

Students who expect to major in sociology are advised to elect freshman biology and Zoology 35. At least 24 junior-senior credits in sociology are required. Students are required to take Sociology 53 and 82 and are urged also to select courses in economics, history, government, and psychology.

SOCIAL WORK

Students interested in pre-professional training in social work are advised to follow the curriculum in sociology. The American

Association of Schools of Social Work indicates that the pre-professional subjects most closely related to professional work in this field are economics, political science, psychology, and sociology. The Association recommends that prospective students of social work or social administration take not fewer than 12 semester hours in one of these subjects while taking less in others. It also recognizes the value of courses in biology, history, English, as well as other subjects contributing to a broad cultural background for the student.

ZOOLOGY

G. L. WOODSIDE, *Adviser*

The courses in zoology have two major aims: (1) to offer students an opportunity to develop an understanding and appreciation of the scientific method as a part of a liberal education; and (2) to provide training for prospective graduate students in biology, medicine, dentistry, and related fields, as well as future teachers and laboratory technicians in the biological sciences.

The minimum requirements for majors are: Zoology 1, 35, 50, 53, 71, 72, and either 83 or 84; Chemistry 1, 2, 29, 30, 51, 52; Physics 25, 26.

SPECIAL CURRICULA IN ARTS AND SCIENCES

In addition to the major work provided in the departments previously listed, the following special curricula are available. For the most part these cut across departmental lines. Students in these curricula follow the uniform science program for the freshman year and the recommendation in regard to sophomore electives indicated in each curriculum.

PRE-MEDICAL CURRICULUM

Advisory Committee: G. L. Woodside, Chairman, W. L. Machmer, G. W. Alderman, L. M. Bartlett, W. S. Ritchie, J. H. Smith.

Pre-medical and pre-dental students should register with a member of the pre-medical advisory committee as soon as possible after entering the university. Pre-veterinary students may register with the pre-medical advisory committee or with the school of their choice. Pre-medical or pre-dental students will be assigned a member of the committee as adviser, and as long as they remain pre-medical or pre-dental students they will continue under this adviser. The assignment is made alphabetically as follows: A-C, Dr. Woodside; D-G, Dr. Smith; H-L, Dr. Ritchie; M-R, Dr. Bart-

lett; S-Z, Mr. Alderman. During the second semester of the sophomore year the committee will study the academic record and general qualifications of every pre-medical and pre-dental student. After such careful study specific recommendations will be made as to whether each student should continue with the curriculum or change his objective and choose another major.

During the first two years the student in this curriculum follows the program outlined on page 90. He will be required also to complete fifteen junior-senior credits in the department of his choice, but the member of the pre-medical advisory committee to whom he has been assigned will continue to be his adviser. In the sophomore year the following courses should be elected: Chemistry 29, 30; Physics 25, 26; German 25, 26. In the senior year Chemistry 65, 66 (Physical) is highly recommended (prerequisites, Mathematics 29, 30).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Zoology 71, Comp. Vert. Anatomy	4	Zoology 72, Vert. Embryology	4
History	3	¹ Electives	9
¹ Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
¹ Electives	15	Zoology 84, Cellular	4
		¹ Electives	12

¹ The electives of the junior and senior years should include the requirements of the department in which the student wishes to major. Pre-medical students should elect as many non-science courses in the College of Arts and Sciences as possible, since Class A medical schools uniformly stress the importance of a broad general education.

CURRICULUM IN NURSING

L. A. BRADLEY, *Adviser*

The opportunity is available for women students completing two years of study to transfer to the Cornell School of Nursing and other accredited Schools of Nursing, and after three years to obtain both the degree of B.S. and R.N. Such students must include in their freshman and sophomore programs six hours of chemistry, six hours of biology, and three hours of psychology.

CURRICULUM IN RECREATIONAL LEADERSHIP

W. G. VINAL, *Adviser*

This curriculum is opened to a limited number of recommended students who seek training as leaders in the various recreational activities (physical, park, community, nature, camping, and the like).

The course of each student is planned to fit his personal aims and aptitudes. The freshman and sophomore requirements are those of the College of Arts and Sciences. The required upperclass courses are Bacteriology 61, Art 75, Biological Field Studies 51 and 52, 61 and 62 or Physical Education 73. A minimum of 15 semester hours in some one field related to that branch of recreational leadership chosen by the student is expected.

Because programs of study vary with the individual student, three types of curricula taken by former students are given below:

PLAYGROUND LEADER IN URBAN AREAS

JUNIOR YEAR

German 25
Physics 25
Forestry 55
Biol. Field Stu. 51
Physical Educ. 55

Physical Educ. 53
German 26
Forestry 56
Biol. Field Stu. 52
Physical Educ. 72

SENIOR YEAR

Bacteriology 61
Land Arch. 51
Land Arch. 79
Art 75
Biol. Field Stu. 61
Physical Educ. 71

Entomology 26
English 64
Land Arch. 52
Bacteriology 62
Biol. Field Stu. 62
Physical Educ. 52

RANGER NATURALIST IN METROPOLITAN AND NATIONAL PARKS

Military Science 51
Sociology 51
Land Arch. 51
Bacteriology 61
Forestry 55
Biol. Field Stu. 51

Military Sci. 52
Land Arch 52
Economics 25
Astronomy 58
Forestry 56
Biol. Field Stu. 52

Military Sci. 75
Botany 81
Land Arch. 75
Botany 25
Speech 91
Biol. Field Stu. 61

Military Sci. 76
Botany 84
Geology 62
Physical Educ. 72
Biol. Field Stu. 62

COMMUNITY RECREATION

Sociology 51
Education 51
French 29
Bacteriology 61
Physical Ed. 61
Biol. Field Stu. 51
Music 61

Entomology 90
Speech 89
French 30
English 46
Physical Ed. 62
Biol. Field Stu. 52

English 65
Speech 91
French 71
Land Arch. 75
Physical Ed. 81
Biol. Field Stu. 61

English 51
English 68
Home Econ. 80
Physical Ed. 82
Biol. Field Stu. 62
Physics 58

SCHOOL OF AGRICULTURE AND HORTICULTURE

D. H. SIELING, *Dean*

The School of Agriculture and Horticulture with its several departments offers a broad general education with specific training in some phase of agriculture or horticulture. Upon the completion of the requirements for graduation, the student will have devoted about one-quarter of his time to pure science, one-quarter to social and humanistic studies, and about one-half to applied science and technology in agriculture and horticulture.

A broad choice of electives within the required courses of each curriculum gives the student the opportunity to prepare for (1) actual agricultural production; (2) research, teaching, or extension work; or (3) industrial work.

Each department of the school has specific requirements for graduation which are included in the descriptive matter under the name of the department. To prevent overspecialization, each student is required to elect at least 12 junior-senior credits in some other school of the University, one-half of these credits to be in the humanities and social sciences.

During the first semester of the freshman year, students interested in teaching vocational agriculture, extension work, or specializing in research work, should consult with the head of the department in which they plan to major.

The School comprises the following departments: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Dairy Industry, Floriculture, Food Technology, Forestry and Wildlife Management, Landscape Architecture, Olericulture, Pomology, Poultry Science, and Veterinary Science. Students may major in any one of these departments except Veterinary Science.

CURRICULA IN AGRICULTURE AND HORTICULTURE

All students will take the following uniform curriculum during the first two years:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Mathematics 7, Algebra and Trigonometry	3	¹ Mathematics 8 or 10	3
² Chemistry 1, General	3	² Chemistry 2, General	3
Botany 1, General	3	Zoology 1, General	3
Military 1 (men)	3	Agronomy 2, Soils	3
³ Elective	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

¹ Candidates for the Bachelor of Vocational Agriculture degree will take History 5 and 6 in place of Mathematics.

Students who expect to take Calculus in the sophomore year should elect Mathematics 10.

² Those intending to major in Landscape Architecture and Ornamental Horticulture may substitute a foreign language or History 5 and 6 for the year course in Chemistry.

³ Students intending to major in Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry or Poultry Husbandry will take Animal Husbandry 1, Agriculture. Students intending to major in Floriculture, Forestry, Landscape Architecture, Olericulture or Pomology will take Horticulture 1, Plant Propagation. Wildlife Management majors are requested to take a year of modern language in place of Horticulture 1 and Agronomy 2 in the freshman year. Agronomy 2 is required but may be taken in the sophomore year. Food Technology majors will take Mechanical Engineering 1, Drawing. One year of foreign language may be substituted for Drawing 1 and Agronomy 2 by special permission.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Economics 25, Elements	3	Psychology 26, General	3
¹ A Science	3-4	¹ A Science	3-4
² Electives	6	² Electives	6
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ To be selected from the following:

Bacteriology 31, 31A	Physics 25, 26
Botany 25, 26, 28	Zoology 25, 35
Chemistry 29, 30, 31, 32	Entomology 26
Geology 27, 28	Civil Engineering 27
Mathematics 29, 30	

² The student will be guided in his selections by his major adviser.

JUNIOR-SENIOR CURRICULA IN AGRICULTURE AND HORTICULTURE

At the end of the sophomore year each student selects one of the following curricula as his major to complete his collegiate training.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

A. H. LINDSEY, *Adviser*

The purpose of the Agricultural Economics and Farm Management major is to train students for positions in those private and government institutions servicing the agricultural industry and to assist in the training of farm managers.

The department maintains an inventory of current price information and agricultural production reports from which price study and analysis may be made. Statistical machines are also available for computation and analysis. The laboratories of the department must be found in business institutions and on farms in Massachusetts with which contact is maintained.

Two curricula are available.

AGRICULTURAL ECONOMICS

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Ec. 55, Mark'g Farm Prod.	3	Ag. Ec. 56, Coop. in Agri.	3
Ag. Ec. 57, Agri. Credit	3	Agricultural Electives	6
Agricultural Electives	6	General Electives	6
General Electives	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25	3	Agri. Ec. 76, Farm Mgt.	2
Agri. Ec. 79, El. Statis.	3	Agricultural Electives	3
Ag. Ec. 75, Farm Mgt.	3	General Electives	11
Agricultural Electives	3		
General Electives	3		

All Agricultural Economics majors must take the courses listed above. Specialization may be in one of the three following fields: (1) Animal products, (2) Fruits and Vegetables, (3) Feeds and Fertilizers.

The following courses should be completed for each of these specialized fields:

<i>Animal Products</i>	<i>Fruits and Vegetables</i>	<i>Feed and Fertilizer</i>
An. Husb. 53	Pomology 53	Agronomy 51
An. Husb. 54	Pomology 77	Agronomy 52
Dairy 52	Olericulture 74	Agronomy 78
Dairy 77	Olericulture 78	An. Husb. 51
Dairy 78	Food Technology 75	An. Husb. 78
Poultry 75		Poultry 56

FARM MANAGEMENT

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 55, Mktg. Farm Prod.	3	Agri. Ec. 56, Coop. Agri.	3
Agri. Ec. 57, Agri. Cr.	3	Agronomy 52, Soil Util.	3
An. Husb. 51, Nutrition	3	Agri. Ec. 78, Land Econ.	3
Electives	6	Bus. Law 70	3
		Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 71, Theory	3	Agri. Ec. 76, Farm Mgt.	2
Ag. Ec. 75, Farm Mgt.	3	An. Husb. 78, Dairy Cattle Prod.	4
Agronomy 51, Field Crops	3	Poultry 78, Management	2
Forestry 55, Mgt. Woodlands	3	Electives	8
Electives	3		

AGRONOMY

W. G. COLBY, *Adviser*

The department of agronomy is equipped with modern soils, crops and chemical laboratories, greenhouses, and utilizes parts of the university farm for fertilizer and plant growth experimentation, and for demonstration of soil utilization and conservation.

The courses are designed to give instruction concerning the basic knowledge of the soil and its management, fertilizers, and their uses as related to the principal products of the field. Crop improvement practices and the science of crop improvement are stressed for those who are interested in agronomy as a specialty.

There is sufficient flexibility within the curriculum to allow the student to specialize in soil science, plant science, soil conservation or general agronomy. Those students who have a desire to receive training which will qualify them for investigational work in these fields may obtain it by selecting appropriate supporting science or vocational subjects as electives. This training equips them to serve as specialists in one of these selected fields for industrial corporations and may serve also as training for extension or teaching work.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 57, Soil Formation	3	Agron. 52, Soil Utilization	3
Zoology 53, Genetics	3	Electives	9
Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 51, Field Crops	3	Agron. 78, Fertilizer and Soil	3
Chem. 51, Organic	4	Fertility	3
Electives	9	Chem. 52, Organic	4
		Electives	9

ANIMAL HUSBANDRY

V. A. RICE, *Adviser*

The broad purpose of the Animal Husbandry major is that of providing the basic training for specialists in animal husbandry. Upon graduation, opportunities are available in the practical, scientific or commercial fields of animal husbandry; i.e., livestock farming, research, teaching, administration, or in the business phases of the livestock industry.

Students who major in the department of Animal Husbandry must successfully complete one summer of placement training as a requirement for graduation.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 51, Nutrition of		An. Husb. 56, 56A, Beef and	
Farm An.	3	Sheep Production	4
An. Husb. 53, El. Meat Packing	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 75, An. Breeding	4	An. Husb. 76, Animal Breeding	
An. Husb. 81, Seminar	1	Practice	1
Electives		An. Husb. 78, Dairy Cattle	
		Production	4
		An. Husb. 82, Seminar	1
		Electives	

DAIRY INDUSTRY

D. J. HANKINSON, *Adviser*

Major students in Dairy Industry receive instruction in the testing, handling, and processing of milk, ice cream, butter, cheese, and other milk products. Practical application is made of chemistry, bacteriology, economics, and engineering in the many phases of dairy work.

The dairy industry department, with student laboratories for the testing and manufacture of dairy products, research laboratories, and commercial scale milk and ice cream plant facilities, is housed in Flint Laboratory, a building devoted solely to dairy work.

Dairy industry graduates may secure responsible positions with commercial dairy manufacturing firms, or with equipment and supply firms. Opportunities are offered also for positions as teachers in high schools and colleges, for service in the fields of extension and research, and for sanitation and public health work with city, state or federal agencies.

Major students in dairy industry must successfully complete one summer of placement training in a dairy plant. It is recommended that this requirement be met during the summer immediately following the sophomore year of University residence.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 77, Butter and Cheese	4	Dairy Ind. 50, Judging	1
Chem. 51, Organic	4	Dairy Ind. 52, Mkt. Milk	4
Bact. 61, Public Health	3	Chem. 52, Organic	4
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 75, Chemistry	3	Agr. Engin. 80 Food Process Eng.	3
Dairy Ind. 79, Seminar	1	Dairy Ind. 78, Ice Cream	4
Bact. 81, Applied	4	Dairy Ind. 80, Seminar	1
Electives	9	Bact. 90, sanitary	3
		Electives	6

FLORICULTURE

C. L. THAYER, *Adviser*

The courses in Floriculture provide for a comprehensive and detailed study of the practices and principles involved in the production, marketing and uses of cut flowers, flowering and foliage plants grown outdoors and under glass. Opportunities available to graduates may include: positions in various fields of commercial

floriculture, such as production, wholesale marketing and retailing; employment in nurseries, on private estates and in conservatories; positions in the professional field, including graduate study, teaching in colleges and secondary schools, research and extension work under state, Federal, or other supervision.

It is advantageous for the student to determine, as soon as possible, the type of position for which he wishes to fit himself since the choice of elective courses will depend largely on his decision.

All major students in Floriculture must successfully complete one summer of placement training in work related to their major objective and approved by the Head of the Department. It is recommended that this requirement for graduation be met during the summer following the freshman or sophomore year.

As sophomores majors are advised to take Chemistry 29 and 30 for their Sciences. First semester electives should be Botany 25 and Olericulture 25; second semester Entomology 26 and Floriculture 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 51, Greenhouse Mgt.	3	Flori. 52, Flower Arrangement	3
Flori. 79, Conservatory Plants or	2	Flori. 54, Greenhouse Const.	3
Flori. 81, Herb. Gardens and		Plant Breeding 52, Methods	3
borders	3	Botany 52, Advanced Plant	
Zoology 53, Prin. of Genetics	3	Pathology	3
Entomology 51, Pests of		Electives	3
Special Crops	3		
Botany 51, Plant Pathology	3		
Electives	2-3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 75, Commercial	3	Flori. 76, Commercial	3
Flori. 79 or	2	Flori. 82, Seminar	3
Flori. 81	3	Botany 68, Physiology	3
Botany 67, Physiology	3	Electives	8
Electives	5-9		

FOOD TECHNOLOGY

C. R. FELLERS, *Adviser*

The curriculum in Food Technology provides scientific and applied training in the principles concerned with the processing, preservation, and packaging of foods and food products. Both home and commercial methods of food preservation are considered. Practical work includes canning, freezing, dehydration, and fermentation and salting. Methods of manufacture of jams, jellies, fruit juices, and beverages are a part of course work. An effort

is made to apply the student's background in chemistry and bacteriology to Food Technology problems and food analysis

The curriculum gives the student a broad science background with specialized knowledge in food processing and preservation. Special courses are offered for Home Economics majors who plan to teach or do extension work in foods. Major fields open to graduates include: (1) commercial work in cannery, freezer and other plant operation; (2) control and analytical work related to food products; (3) government food inspection and grading; (4) technological work in government and industry.

Ambitious students are encouraged to acquire the background which will enable them to pursue graduate work and research in the application of scientific knowledge to the technology of foods.

The selection of supporting courses depends upon the objective of the student, which should be determined as early as possible.

Food Technology majors should take Physics 25 and 26 and Chemistry 29 and 30 in the sophomore year; also, if possible, Bacteriology 31 and 31A. Students planning to take Physical Chemistry should complete Mathematics 29 and 30.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 51, Introductory	3	Food Tech. 52, Food Prod.	3
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Bacteriology 51	3	Bacteriology 82, Applied	3
Agr. Engin 80, Food Eng.	3	Agr. Engin. 82, Refrigeration	2
Elective		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 61, Industrial Technology	3	Food Tech. 62, Industrial Technology	3
Food Tech. 71, Food Science Literature	2	Food Tech. 72, Food Science Literature	2
Food Tech. 91, Analysis of Food Prod.	3	Food Tech. 92, Exam. of Food Prod.	3
Chemistry 79, Elem. Biol. or	4	Food Tech. 82, Confections and Cereal Products or	2
Chemistry 65, Physical	3	Chemistry 66, Physical	3
Electives		Electives	

SUGGESTED JUNIOR-SENIOR ELECTIVES

Public Health 61, 62, 63
 A Foreign Language
 Mechanical Engin. 1, 63
 Pomology 77
 Dairy Ind. 75, 77, 52 or 78
 Animal Husbandry 53

Poult. Husbandry 75
 Olericulture 73, 74
 Botany 66
 Home Ec. 30, 52, 54
 Food Tech. 85, 95
 Chem. Engin. 77, 75
 Indus. Engin. 25, 51

FORESTRY AND WILDLIFE MANAGEMENT

This department offers two curricula, one in Forestry and one in Wildlife Management.

FORESTRY

R. P. HOLDSWORTH, *Adviser*

The curriculum in forestry includes a series of courses in technical forestry sufficiently comprehensive to meet the requirements for general undergraduate preparation in this professional field. With its supporting and cognate courses it meets the requirements for admission to the Federal Junior Forester examination. Should the student upon receiving the Bachelor's Degree follow the highly desirable procedure of continuing his education at a graduate school of forestry, he should receive credit for a considerable proportion of the technical courses accomplished here. The additional time required to obtain the Master of Forestry Degree would normally be one year.

Should the student elect to pursue a pre-professional curriculum in forestry, giving less time to technical forestry courses and more to the basic sciences and cultural subjects, the time required to obtain the Master of Forestry Degree at a graduate school after graduation here will be two years.

Most of the forestry courses are open to students other than those concentrating in forestry, but these courses should be elected only after consultation with the student's major adviser, and the instructor teaching the course.

During a summer term following the freshman year forestry majors should plan to take Forest Mensuration, Forest Photogrammetry, and Plane Surveying. These courses are part of the required curriculum and are basic to forestry employment during the summer following the sophomore and junior years.

Sophomore majors in forestry take Physics 25 and Geology 27 the first semester; Entomology 26, Physics 26, Botany 28, and Forestry 26 the second semester.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 53, Silvics	3	Forestry 56, Prin. of Silviculture	3
Forestry 59, Protection	3	Forestry 54, Forest Soils	3
Forestry 75, Products	3	Wildlife Mgt. 72, Forest-Animal	3
History	3	Relationships	3
Elective	3	Entomology 72, Forest Ent.	3
		History	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 81, Regional Silvicult.	3	Forestry 82, Seeding and Planting	3
Forestry 57, Forest Policy & Econ.	3	Forestry 80, Forest Mgt.	3
Botany 51, Plant Pathology	3	Forestry 78, Harvesting	3
Electives*	6	Electives*	6

*Electives should be chosen in consultation with the student's adviser.

WILDLIFE MANAGEMENT

R. E. TRIPPENSEE, *Adviser*

The courses in wildlife management are designed both for those who desire a general understanding of the conservation of wild animals and for the professional student who expects to make his living in the wildlife field. Courses in wildlife conservation and management make excellent supporting work for students of public administration, economics, agriculture, zoology, entomology, forestry, agronomy, and education. Particular emphasis is given to wild animals on both forest and farm lands.

Students who expect to continue studies for advanced degrees are eligible for graduate work either in Graduate School at the University of Massachusetts or in other institutions offering graduate work in this field.

Wildlife management is both an applied science and an art, and is concerned with the production and control of wild-animals crops on both wild and cultivated lands. In order to manage land, a knowledge of the origin and management of land is necessary. Thus, work in geology, soils, forestry, and agriculture is included in the training. Fields of specialization include fisheries management, game management, fur production, and control of injurious animals. Related fields include soil conservation, conservation education, and industrial biology.

Studies in wildlife management will be closely correlated with the work carried on by the State Department of Conservation and the U. S. Fish and Wildlife Service. During the junior and senior years trips will be planned to study the work at the John C. Phillips Wildlife Laboratory at Upton and to attend the New England Game Conference. Numerous other wildlife projects will also be visited.

Wildlife Management majors are required to take one year of language, Agronomy 2, and Geology 27. They are urged to take Forestry 52 and 55 during the summer session following the freshman year if possible.

Sophomores should elect four courses from the following: Wildlife Management 27, Forestry 26, Bacteriology 31 and 31A, Zoology 35, Chemistry 29, Geology 27, Mathematics 29, Physics 25 and 26, Entomology 26, Agronomy 2.

Students expecting to go into fisheries management should elect Physics 25 and 26; Chemistry 29, 30; Zoology 35, 74, 81, 86; Public Health 64.

Students who expect to go into Public Relations or teaching should elect English 81 or 84, Speech 91 or 92, and Education 52, 61, 62.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 71 or 75	3	Wildlife Management 70	3
Electives*		Wildlife Management 74 or 84	3
		Electives*	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 75 or 71		Wildlife Management 74 or 84	3
Electives*		Electives*	

* Electives should be chosen in consultation with the student's adviser.

LANDSCAPE ARCHITECTURE

R. H. OTTO, *Adviser*

Instruction in this department has two objectives: first a contribution to general education; second, a preparation of students for the professional practice of Landscape Architecture. The department offers optional curricula, (1) Professional Landscape Architecture, and (2) Ornamental Horticulture.

LANDSCAPE ARCHITECTURE

Students following this professional curriculum are prepared to take up work in Landscape Architecture, which leads through field experience or post-graduate study to permanent establishment in the profession.

Sophomores in the first semester elect either Botany 25 or Geology 27 for their Science and take Landscape Architecture 25 (Drawing) and Civil Engineering 27 as electives. In the second semester the Science is either Entomology 26 or Geology 28 and the elective Landscape Architecture 26 (Drafting) and Horticulture 26 (Plant Materials).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Elements of	
Landscape Arch. 53, Garden Design	3	Landscape Arch.	3
Hort. 51, Plant Materials	3	Landscape Arch. 54, General Design	3
Landscape Arch. 79, Construction & Maintenance alternate with Art 83	3	Hort. 52, Planting Design	3
Elective	3	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 81, Advanced Design	3	Landscape Arch. 76, Civic Art	3
Art 75, Art Appreciation	3	Landscape Arch. 82, Advanced Design	3
Art 77, History of Art	3	Art 78, History of Art	3
Landscape Arch. 83, alternate with Landscape Arch. 79	3	Landscape Arch. 80, History and Lit. of Landscape Arch.	2
Elective	3	Electives	4

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Agronomy 53, 56, Agrostology
 Landscape Arch. 84, Sketching
 Botany 81, Plant Ecology
 Civil Engin. 90, Contracts, Specifications, and Estimating

Agric. Engin. 51, House Planning
 Floriculture 81, Herbaceous Borders
 Philosophy 82, Aesthetics

ORNAMENTAL HORTICULTURE

The curriculum in Ornamental Horticulture is suggested for those preferring to follow the horticultural phase of Landscape including (1) nursery work; (2) planting; and (3) maintenance of landscaped areas, such as parks and semi-public institution grounds.

Sophomores in this major will take Botany 25, Civil Engineering 27, Landscape Architecture 25 in the first semester; Entomology 26, Floriculture 26, and Horticulture 26 in the second.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Hort. 51, Plant Materials	3	Hort. 52, Planting Design	3
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Construction details	3
Agrostology 53, Turf Grasses	3	Pomology 26, Small Fruits	3
Landscape Arch. 79, Construction & Maintenance alternate with Botany 81	3	Agrostology 56, Turf Mgt.	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 81, Herbaceous Borders	3	Entomology 72, Shade Tree Insects	3
Landscape Arch. 53, Garden Design	3	Pomology 56, Spraying	3
Zoology 53, Genetics	3	Plant Breeding 52, Methods	3
Forestry 55, Mgt. of Woodlands	3	Botany 51, Plant Pathology	3
Botany 81, Plant Ecology	3	Elective	4
Alternate with Landscape Arch. 79			

OLERICULTURE

G. B. SNYDER, *Adviser*

The courses in Olericulture offer a comprehensive training in the scientific principles and commercial practices related to the culture and marketing of vegetable crops. The studies and training involved are set up to prepare graduates to undertake work in the following fields: (1) practical work in operating commercial market garden or truck farms or greenhouse establishments, (2) teaching Olericulture and related subjects in college, secondary or high schools, (3) extension work in Horticulture and Agriculture, (4) research studies with state, Federal, or private agencies, (5) state, Federal, or private inspection service agencies, and (6) the wholesale and retail marketing of vegetables and other perishable commodities.

The department of Olericulture has facilities in greenhouses, plant houses, hot beds, machinery and equipment used in production and marketing procedures as well as land to provide the student ample opportunity to become acquainted with modern techniques and practices used in handling vegetable crops. Nearby truck farms, wholesale and retail market outlets, variety trial plots of seed companies and inspection agencies are used to demonstrate laboratory and classroom points of discussion.

The rather broad objectives of the training mean that the selection of supporting courses depends upon the specific field in which the student wishes to engage on graduation. This objective should, therefore, be determined as early as possible during the sophomore year.

Majors in Olericulture should take the following courses during the first semester of the sophomore year: Chemistry 29 Botany 25, and Olericulture 25. In the second semester they should include Chemistry 30, Entomology 26, and Pomology 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 51, Nutrient Requirements	3	Oleri. 52, Environment and	
Zoology 53, Genetics	3	Plant Culture	3
Botany 51, Plant Pathology	3	Oleri. 76, Greenhouse Crops	3
Botany 67, Plant Physiology	3	Botany 68, Plant Physiology	3
Electives	5	Electives	6-8

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 73, Marketing Practices	3	Oleri. 74, Merchandising of	
Oleri. 75, Systematic	3	Perishables	3
Oleri. 81, Seminar	1	Oleri. 78, Commercial	3
Entomology 51, Pests of		Oleri. 82, Seminar	1
Special Crops	3	Electives	10
Electives	7		

POMOLOGY

A. P. FRENCH, *Adviser*

The Pomology courses provide a comprehensive training in the scientific and commercial principles concerned in the growing and marketing of apples, pears, peaches, plums, cherries, and small fruits. Major fields open to graduates include: (1) practical work in connection with the operation of fruit farms; (2) teaching in college, high school, or secondary schools of agriculture; (3) extension work in county, state, or nation; (4) research work with state, federal or private connections; and (5) commercial work in connection with the manufacture and sale of such supplies as machinery, packages, and spraying and dusting materials. Certain supporting courses are required and their selection depends upon the objective of the student. That objective should, therefore, be determined as early as possible.

First semester sophomores are advised to elect Geology 27, Physics 25, and Olericulture 25. In the second semester they should take Chemistry 29, Entomology 26 and Pomology 26.

The selection of junior-senior electives should be undertaken with the help of the departmental adviser. They will depend for the most part on the interests and objectives of the students and his class record to date. The student who wishes to do college teaching, extension work, or research is advised to secure a broad foundation in science and liberal arts, and to plan to enter a graduate school sooner or later. The student whose objective is growing fruit or teaching in secondary school may need to broaden his training in horticulture and agriculture and, again, will need all the science and liberal arts that can be included in the program.

Students majoring in Pomology must have had a minimum of one summer's practical experience on a fruit farm before the beginning of the senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 53, General	3	Pomology 56, Spraying	3
Pomology 75, Systematic or	4	Botany 68, Physiology	3
Pomology 77, Commercial	3	Chemistry 32	3
Botany 51, Plant Pathology	3	Electives	
Botany 67, Physiology	3		
Chemistry 31	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 81, Advanced	3	Pomology 82, Advanced	3
Pomology 75, Systematic or		Pomology 84, Seminar	1
Pomology 77, Commercial	3	Electives	
Pomology 83, Seminar	1		
Zoology 53, Genetics	3		
Electives			

CURRICULUM IN CRANBERRY TECHNOLOGY

This curriculum is designed to provide a broad training in the fields of knowledge which serve as the foundation of the cranberry industry. Its purpose is to provide future leaders and specialists for the industry.

Students who follow this curriculum must satisfactorily complete a minimum of two summers' practical experience in the cranberry industry before the beginning of the senior year.

Courses taken during the freshman and sophomore year will be the same as those outlined for others majoring in Pomology. The choice of junior-senior electives will depend upon the objective of the student and will be made with the assistance of the adviser.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. 31, Organic	3	Chem. 32, Organic	3
Botany 51, Plant Pathology	3	Pomology 56, Spraying	3
Ent. 51, Pests of Special Crops	3	Ag. Econ. 26, Ag'l Prod.	3
Electives		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bot. 67, Plant Physiology	3	Bot. 68, Plant Physiol. 3	3
Ag. Econ. 55, Marketing	3	Ag. Econ. 56, Cooperatn.	3
Pom. 85, Cranberry Prob.	2	Pom. 86, Cranberry Prob.	2
Electives		Electives	

POULTRY HUSBANDRY

F. P. JEFFREY, *Adviser*

The department gives instruction in the science, art and practices of poultry keeping, not only to students specializing in this department, but also to those in other departments who desire supporting work in poultry husbandry. The major courses prepare men for the successful operation of commercial poultry and breeding farms and hatcheries either as owners or managers; for high school, college and federal work in teaching, extension and research; and as service men, specialists and managers in industrial fields allied to the poultry industry.

Rhode Island Reds, Barred Plymouth Rocks, White Plymouth Rocks, New Hampshires, and S. C. White Leghorns and several other breeds are maintained on a commercial basis at the poultry plant. There are modern buildings in which ventilation, breeding, feeding, incubation, brooding, marketing and managerial experimental projects are taking place, with up-to-date equipment.

Students must successfully complete one summer of placement training on a poultry farm or in some business allied to poultry.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 55, Housing and Sanitation	2	Poultry Husb. 52, Incubation and Brooding	3
Poultry Husb. 53, Judging	3	Poultry Husb. 56, Nutrition	3
Zoology 53	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 75, Marketing	2	Poultry Husb. 78, Seminar and Farm Management	3-4
Poultry Husb. 77, Breeding	3	Poultry Husb. 76, Turkey Prod.	2
Vet. Sci. 75, Comp. Vet. Anat.	3	Vet. Sci. 88, Avian Path.	3
Electives		Electives	

VETERINARY SCIENCE

Though major work in Veterinary Science is not available, the department does offer supporting courses to assist students who expect to enter the various fields of agriculture, public health, teaching and laboratory work in the biological sciences or veterinary medicine.

SCHOOL OF BUSINESS ADMINISTRATION

PHILIP L. GAMBLE, *Acting Dean*

The School of Business Administration is designed to prepare students for the numerous activities connected with the inception, operation and control of business enterprises without overlooking the need for a well-rounded education. Four specialized and one general curricula are offered to better prepare students for assuming the responsibilities of the adult citizen. Each of these curricula emphasizes general education in a common program for the first two years and reserves concentration on specialized programs for the last two years.

The differentiated and specialized curricula offered for the junior-senior years are in Accounting, Finance, Industrial Administration, and Marketing. These curricula are supplemented by a less specialized curriculum in General Business. Each course of study leads to the degree of Bachelor of Business Administration.

CURRICULA IN BUSINESS ADMINISTRATION

The courses for the first two years are largely prescribed. Each student therefore follows a nearly uniform program of studies until he begins his specialization. General education is emphasized by providing fundamental courses in the humanities, mathematics, science, and social science.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
¹ Government 25, American	3	¹ History 6, Mod. European Civ.	3
Mathematics 7	3	Mathematics 8 or 10	3
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Foreign Language or Industrial		¹ Foreign Language or Economics	
Adm. 11, Econ. Geography	3	12, Ec. Hist. of U. S.	3
Elective, Science	3	Elective, Science	3
Military 1	3	Military 2	2
Physical Ed. 7 (women)	2	Physical Ed. 8 (women)	2
Physical Ed. 3 (men)	1	Physical Ed. 4 (men)	1

¹Students majoring in Merchandising take a year of foreign language and Ind. Adm. 11 and either Econ. 12 or Home Econ. 2 in place of Gov. 25 and History 6.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25, Principles of	3	² Accounting 26, Principles of	3
Economics 25, Elements	3	Economics 26, Distribution	3
English 25, Humane Letters	3	English 26, Humane Letters	3
¹ Psychology 26, General	3	² Sociology 28, Elements	3
Elective	3	Elective	3
Military 25	2	Military 26	2
Physical Ed. 33 (men)	1	Physical Ed. 34 (men)	1
Physical Ed. 27 (women)	2	Physical Ed. 28 (women)	2

¹Students majoring in Merchandising take Govt. 25 in place of Psych. 26.

²Students majoring in Merchandising take Psych. 26 in place of either Acct. 26 or Soc. 28.

JUNIOR-SENIOR CURRICULA IN BUSINESS ADMINISTRATION

GENERAL BUSINESS

P. L. GAMBLE, *Adviser*

This program is offered to meet the needs of those students whose interest is in general business rather than in some more specialized field. The program is designed to provide training in the social sciences, particularly economics, as well as in the applied fields of business administration. This training should fit a man for initial employment in the training courses of large corporations or for work in small businesses and for further study in graduate school of a more specialized nature.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Credit	3	Ec. 56, Business Cycles	3
Mktg. 53, Marketing & Mktg. Prob.	3	Ind. Adm. 76, Prin. of Transportation	3
Finance 65, Corporation Finance	3	Ag. Ec. 79, Prin. & Methods of Statistics	3
Ind. Adm. 83, Bus. Mgt.	3	Ec. 70, Monopolies	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bus. Law 70	3	Ec. 80, Labor Legislation	3
Ec. 73, Modern Econ. Theory	3	Fin. 78, Public Finance	3
Ec. 79, Labor Problems	3	Professional Elective*	3
Professional Elective*	3	Electives	6
Elective	3		

* Professional electives are to be chosen subject to the approval of the adviser.

ACCOUNTING

R. M. COLWELL, *Adviser*

This curriculum is designed to train students to understand business operations from the viewpoint of income, costs, valuation, financial systems and policies and the interpretation and execution thereof. In addition to providing a general business background, this curriculum is the foundation for advanced training in accountancy and financial management. The special positions of accountancy for which students can qualify are: auditors, certified public accountants, comptrollers, cost analysts, credit analysts, income-tax consultants, industrial accountants, public accountants, private accountants, system designers, and teachers of accounting.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking & Credit	3	Business Law 70	3
Finance 65, Corporation Finance	3	Acctg. 72, Advanced Acctg.	3
Mktg. 53, Marketing & Mktg. Prob.	3	English 84, Expository Writing	3
Acctg. 71, Advanced Acctg.	3	Ag. Ec. 79, Prin. & Methods of Statistics	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Ec. Theory	3	Fin. 78, Public Finance	3
Ind. Adm. 83, Business Mgt.	3	Ec. 82, Investments	3
Acct. 73, Cost Accounting	3	Acctg. 74, Acctg. Systems	3
Acct. 75, Adm. Acct. & Control	3	Acctg. 76, Auditing	3
Elective	3	Elective	3

FINANCE

M. KIMBALL, *Adviser*

Courses in banking, finance and insurance are provided for students who expect to assume managerial responsibilities for financing a business or to work for banks, investment institutions, brokerage houses, insurance companies, and governmental agencies concerned with finance. The curriculum provides for study of our monetary and credit institutions, the principles and procedures of

financial administration, the principles and practices of insurance, training for investment analysis and the formation of investment policies.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 53, Money, Banking & Crd.	3	Ec. 56, Business Cycles	3
Fin. 65, Corporation Finance	3	Ag. Ec. 79, Statistics	3
Ind. Adm. 83, Business Mgt.	3	Bus. Law 70, Business Law	3
Mktg. 53, Principles of Mktg.	3	Professional Elective	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Econ. Theory	3	Fin. 76, Insurance	3
Ec. 79, Labor Problems	3	Fin. 78, Public Finance	3
Fin. 81, Problems of Bus. Fin.	3	Fin. 82, Investments	3
Electives	6	Electives	6

INDUSTRIAL ADMINISTRATION

E. SCHEMP, *Adviser*

Expanding American industry now offers to qualified students the opportunity to find satisfying careers in the various fields of industrial management, labor relations, or personnel management. The curriculum offered is designed to give the student specialized training in these fields and a detailed and comprehensive understanding of the problems of business enterprise.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mktg. 53, Mktg., & Mktg. Prob.	3	Business Law 70	3
Ec. 79, Labor Problems	3	Ec. 80, Labor Legislation	3
Ind. Adm. 83, Business Mgt.	3	Psych. 86, Industrial	3
Acctg. 73, Cost Accounting	3	Mech. Engin. 28, Machine Shop	3
Elective	3	Ag. Ec. 79, Prin. & Methods of Statistics	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Acct. 75, Adm. Acct. & Control	3	Ind. Adm. 76, Prin. of Transportation	3
Finance 53, Money, Banking & Crdt.	3	Ind. Engin. 88, Time & Motion Study	3
Fin. 65, Corporation Finance	3	Mktg. 52, Industrial Purchasing	3
Ec. 73, Modern Ec. Theory	3	Ind. Adm. 84, Personnel Adm.	3
Electives	3	Electives	3

MARKETING

H. E. HARDY, *Adviser*

This program is designed to train students to understand the advertising, selling and related problems of wholesale and retail

enterprises and industrial firms. The curriculum offers general training in economics and business principles along with specialized study of basic types of market operations.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Money, Banking Credit	3	Mktg. 54, Sales Mgt & Sales-manship	3
Mktg. 53, Mktg. & Mktg Prob.	3	Mktg. 72, Market Research	3
Ec. 79, Labor Problems	3	Business Law 70	3
Ag. Ec. 79, Prin. & Methods of Statistics	3	Ind. Adm. 76, Prin of Transportation	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 55, Ec. of Consumption	3	Mktg. 52, Industrial Purchasing	3
Ec. 73, Modern Ec. Theory	3	Mktg. 74, New England Markets	3
Mktg. 71, Retail Merchandising	3	Psych. 86, Industrial Psych.	3
Mktg. 73, Advertising	3	Professional Elective*	3
Elective	3	Elective	3

* Professional elective is to be chosen subject to the approval of the adviser.

MERCHANDISING

H. E. HARDY, *Adviser*

This curriculum has been planned primarily to meet the growing demand for women with both business and technical training to fill positions of responsibility in the merchandising of women's wear, textiles, home furnishings, and foods. While offering a broad educational background, this program is sufficiently flexible to allow individual choice in the field of concentration.

Students majoring in this field should take Chemistry 1 and 2 and Home Economics 26 or 30 or Chemistry 32 the second semester. should take Home Economics 31 or Chemistry 31 the first semester as their elective science in freshman year, and in sophomore year

Those interested in more emphasis in home economics may refer to the Merchandising and Retailing curriculum under Home Economics.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
Mktg. 53, Mktg. & Mktg. Prob.	3	Mktg. 72, Research	3
Econ. 55, Econ. of Consump. or Home Ec. 75, Econ. of Household	3	Business Law 70	3
Home Ec. 51, Food Selection or Home Ec. 61, Clothing Select.	3	Home Ec. 52, Nutrition or Home Ec. 62, Home Furnishing	3
¹ Professional Elective	3	¹ Professional Elective	3
Elective	3	Elective	3

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
Mktg. 71, Retailing	3	Ind. Adm. 84, Personnel Am.	3
Mktg. 73, Advertising	3	Home Ec. 88, Appld. Dress Dsn.	3
Home Ec. 87, Tailoring or		or	
Home Ec. 91, Inst. Mgt.	3	Home Ec. 92, Inst. Mgt.	3
¹ Professional Elective	3	¹ Professional Elective	3
Elective	3	Electives	6
		Field Work	

¹ Professional electives are to be chosen subject to the approval of the adviser.

SCHOOL OF ENGINEERING

G. A. MARSTON, *Dean*

The departments of agricultural engineering, civil engineering, mechanical engineering and electrical engineering comprise the School of Engineering. Each department offers a curriculum leading to a Bachelor of Science Degree in that particular branch. An optional curriculum in industrial engineering is offered in the mechanical engineering department. Chemical Engineering is included in the School of Science.

The Civil, Electrical, Mechanical, and the Industrial optional curricula have been accredited by the Engineers Council for Professional Development.

Engineering can be defined as the combination of science and art by which materials and power are made useful to mankind. An engineer requires intensive technical training but at the same time he should acquire the broad education that distinguishes the professional man from the technician. His education does not end with formal schooling but continues throughout his life as he accumulates experience.

The curricula in engineering have been carefully prepared to offer each student the opportunity to acquire a sound training in the fundamental work of the various branches of his chosen field. At the same time he receives a thorough training in the sciences and mathematics, which are the important tools of the engineer. About twenty per cent of his time is devoted to the social and humanistic studies. Some opportunity to pursue his particular interest is offered in the senior year.

The curriculum of the freshman year is the same for all. Specialization to a limited extent begins in the sophomore year.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 5, Analytical Geom.	4	Mathematics 6, Diff. Calculus	4
Chem. 1, General	3	Chem. 4, General	4
Mechanical Engineering 1 (Drawing)	2	Mechanical Eng. 2 (Drawing)	2
Military 1	3	Military 2	2
Physical Ed. 3	1	Physical Ed. 4	1

Elect one of the following:

History 5	3	History 6	3
German 1, 5	3	German 2, 6	3
French 1, 5, 15	3	French 2, 6, 16	3
Spanish 1, 7	3	Spanish 2, 8	3

SOPHOMORE-JUNIOR-SENIOR CURRICULA

Majors in Engineering will select one of the following curricula.

AGRICULTURAL ENGINEERING

H. N. STAPLETON, *Adviser*

Agricultural engineering is concerned with the application of scientific engineering principles to the agricultural industry in which mechanical and electrical power, processing equipment, design and development of a farm structure, soil and water conservation, research, extension, teaching, and promotional activities form parts.

The curriculum is designed to prepare students soundly in basic sciences, engineering, and humanistic subjects for service in this expanding field. There is opportunity for limited specialization and generous provision for electives in the third and fourth years.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Eng. 25, Lit	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Civil Engin. 27, Surveying	3	Civil Engin. 34, Applied Mech (Statics)	3
Mech. Engin. 3, Descript. Geom.	2	Psych. 26, General	3
Military 25	2	Military 26	2
Phys. Ed. 33	1	Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. Engin. 28, Prop. & Topog. Surv.	3	Civ. Engin. 30, Route Surveying Prac.	3
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(or approved industrial or farm employment)

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Engl. 83, Tech. Writing	2	Econ. 25, General	3
Civ. Eng. 52, Kinetics	3	Agron. 2, Soils	3
Civ. Eng. 51, Strength of Mat'l	4	Civ. Eng. 61, Testing	2
Elec. Eng. 61, Principles of	4	Elec. Eng. 62, Principles of	4
Mech. Eng. 65, Heat Eng.	3	Mech. Eng. 68, Kinematics	3
Ag. Eng. 71, Mech. Power	3	Ag. Eng. 73, Farm Structures	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Eng. 85, Farm Electrifi.	3	Ag. Eng. 92, Seminar	1
Ag. Econ. 75, Farm Mgt.	3	Ag. Eng. 76, Agr. Machinery	3
Mech. Eng. 83, Machine Design	3	Ag. Eng. 78, Drain, Recl., Consv.	3
Civ. Eng. 75, Fluid Mech.	3	Civ. Eng. 90, Constr., Spec., Est.	3
Ag.* & Tech.* Electives	6	Ag.* & Tech.* Electives	8-9

* Electives to be selected in consultation with the student's adviser.

CIVIL ENGINEERING

M. P. WHITE, *Adviser*

The profession of civil engineering once included all engineering except military. Today it includes the design and erection of all type of structures, planning and constructing highways, railroads and airports, hydraulics as applied to river control and water-power development, irrigation and drainage, water-supply and sanitary engineering, as well as surveying and mapping. Civil engineers may work on designing and planning, on construction, or on maintenance and operation. Those who enter construction must go wherever their projects take them, while those engaged in design, maintenance or operation are generally located in cities or towns.

The curriculum gives a thorough preparation in the fundamental sciences and, at the same time, prepares the student for work in any branch of civil engineering.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd semester</i>	<i>Credits</i>
Eng. 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Mech. Engin. 3, Descript. Geom.	2	Elec. Engin. 63, Elements of	3
Civ. Engin. 25, Surveying	5	Civ. E. 34, Applied Mech.	3
Military 25	2	(Statics)	3
Phys. Ed. 33	1	Military 26	2
		Phys. Ed. 34 .	1

SUMMER (6 WEEKS)

Civ. E. 28, Prop. & Topog. Surv.	3	Civ. Eng 30, Route Surveying Prac.	3
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JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Psych. 26 or Econ. 25	3	Econ. 25 or Psych. 26	3
Civ. Eng. 51, Strength of Mat'l.	4	Civ. Eng. 70, Theory of Structures	4
Civ. Eng. 55, Highway Engin.	3	Civ. Eng. 61, Testing Mat'ls	2
Civ. Eng. 52, Appl'd. Mech (Kinetics)	3	Civ. Engin. 80, Soil Mechanics	3
Mech. Eng. 65, Thermodynamics	3	Mech. Engin. 59, Mat'l. of Constr.	2
Geol. 50, Engin. Geol.	3	Civ. Engin. 76, Fluid Mechanics	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 71, Structural Design	3	Civ. Eng. 78, Sanitary Engin. II	4
Civ. Eng. 73, Concrete & Masonry	4	Civ. Eng. 90, Contracts, Specif. & Est.	3
Civ. Eng. 77, Sanitary Engin. I	3	Civ. Eng. 92, Professional Sem.	1
Civ. Eng. 81, Foundations	3	Technical Elective *	6
English 83, Technical Writing	2	Non Tech. Elective (Bus. Law 70 recommended)	3
Non-Tech. Elective (Am. Gov't. 25 recommended)	3	*Econ 76, Prin. of Transportation	
		*Civ. Eng. 72, Adv. Struct. Theory	
		*Civ. Eng. 84, Transportation Engin.	
		*Civ. Eng. 86, Sanitary Engin. Design	
		*Civ. Eng. 88, Adv. Stress Analysis	
		*Civ. Engin. 94, Advanced Surveying	
		*Civ. Engin. 96, Hydraulic Engin.	
		*Bact. 54, Fundamentals of Water & Sewerage Bact.	

ELECTRICAL ENGINEERING

ROBERT R. BROWN, *Adviser*

Electrical engineering is that branch of the profession covering the engineering applications of electricity. It reaches into practically every profession, every branch of activity, either through performance of the tasks involved, or through their measurement and control. Because it is so diversified in its applications, it is considered to be divided into various fields such as power communications, electronics, illumination, measurements and control and others, each of these having specialized subdivisions.

The undergraduate curriculum is designed to prepare the student for work in any of these fields, and to serve as a basis for specialization in any of them, either in advanced courses or in the field. At the same time, about one-fifth of the student's work is devoted to the humanistic-social courses so that he may have an understanding of the broader aspects of engineering and its relation to other fields of human endeavor.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Mech. Eng. 3, Descript. Geom.	2	Civ. E. 34, Ap. Mech. (Statics)	3
Econ. 25 or Psych. 26	3	Elec. Engin. 40, Fundamentals	4
Military 25	2	Military 26	2
Physical Ed. 33	1	Physical Ed. 34	1

SUMMER

(May be taken in summer after freshman year)

Mech. Engin. 23, Shop	3 credits
Civ. Engin. 27, Surveying	2 credits

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Eng. 51, A C. Circuits	4	Econ. 25, or Psych. 26	3
Elec. Eng. 53, D.C. Machinery	4	Elec. Eng. 54, A.C. Machinery	4
Elec. E. 57, Engin. Analy.	3	Elec. Eng. 74, Electronics	4
Mech. Eng. 65, Heat Engin. I	3	Civ. Eng. 61, Testing of Mat'ls.	2
Civ. Eng. 53, Strength of Mat'l	3	Mech. Eng. 66, Heat Engin.	3
English 83, Technical Writing	2	Civ. E. 52, Applied Mech. (Kinetics)	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Eng. 75, Applied Electronics	4	Elec. E. 78, Transient Analy.	3
Elec. Eng. 77, Elec. Network Analy.	3	Ind Eng. 86, Industrial Engin.	3
Mech. Eng. 79, Mech. Eng. Eng. Lab. I	2	Elec. Eng. 92, Prof. Sem.	1
Civ. Eng. 75, Fluid Mechanics	3	Technical Elective*	7 or 8
Technical Elective*	4	Non-Technical Elective (Bus. Law 70 or Psych. 86 recommended)	3
Non-Technical Elective (Am. Govt. 25 recommended)	3	*Elec. E. 80, Elec. Comm. II	
*Elec. Eng. 79, Elec. Communications I		*Elec. E. 86, Power Syst. Netw.	
*Elec. Eng. 81, Adv. Elec. Mach.		*Elec. Eng. 84, Ind. Electronics	
		*Elec. Eng. 88, Comm. Netw.	
		*Elec. Eng. 90, Illumination	
		*Elec. Eng. 94, U.H.F. Tech.	
		*Elec. Eng. 96, Electromagnetic Engr.	
		*Elec. Eng. 82, Power Applications in Ind.	

MECHANICAL ENGINEERING

MAURICE E. BATES, *Adviser*

Mechanical engineering is that branch of the profession which, broadly speaking, covers the fields of heat, power, design of machinery, industrial management and manufacturing problems.

Building upon the foundation laid by the departments of mathematics, physics, and chemistry, the department of mechanical engineering undertakes to show the student how fundamental physical laws apply to this field of the profession. The courses selected give the student thorough training in the basic principles so that

particular applications can be mastered in professional practice. Therefore, no attempt is made to give highly specialized instruction.

It must be realized that the modern engineer lives in a time of rapid social and technological change. Only the man who has had a well-balanced cultural and technical program of study can adjust quickly enough to the needs of a continually changing social order. The following curricula emphasize the fundamentals of the four M's of engineering; materials, methods, men, and money, a knowledge of which is vital to the modern engineer.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 27 and 28, Shop 6 credit hours

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Lit.	3	English 26, Lit.	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Mech. Eng. 3, Descript. Geom.	2	Civ. Eng. 34, Appld. Mech. (Statics)	3
Mech. Eng. 59, Mat'l of Constr.	2	Mech. Eng. 72, Fund. of Metallurgy	3
Ind. Engin. 25, Prod. Processes	2	Military 26	2
Military 25	2		

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 25 or Psych. 26	3	Psych. 26 or Econ. 25	3
Civ. Engin. 52, Appld. Mech. (Kinetics)	3	Civ. Engin. 76, Fluid Mech.	4
Mech. E. 67, Mech. Instr. Lab.	1	Mech. Eng. 68, Kinematics	3
Mech. Eng. 63, Eng Thermo-dynamics	4	Mech. Eng. 64, Eng. Thermo-dynamics	3
Elec. E. 61, Principles	4	Elec. Eng. 62, Principles	4
Civ. Eng. 51, Strength of Mat'l.	4	Civ. Eng. 61, Testing of Mat'ls.	2

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mech. Eng. 75, Power Plants	3	Mech. E. 76, Ref. & Air Cond.	3
Mech. E. 77, Internal Combust. E.	3	Mech. E. 80, Mech. Eng. Lab.	2
Mech. Eng. 79, Mech. Eng. Lab.	2	Mech. E. 86, Adv. Mach. Des.	3
Mech. Eng. 83, Machine Design	3	Technical Elect.†	6
Mech. Engin. 85, Dynamics of Mach.	3	Non-Tech. Elect. (Bus Law 70 or Psych. 86, Ind. rec.)	3
Mech. Eng. 91, Sem.	1	†Mech. Engin. 82, Fluid Mach.	
Non-Technical Elect. (Am. Govt. 25 recommended)	3	†Mech. Engin. 88, Steady-Flow Mach.	
		†Mech. Eng. 90, Adv. Metallurgy	
		†Elec. Eng. 65, Ind. Electricity	
		†Ind. Engin. 86, Ind. Mgt.	

INDUSTRIAL ENGINEERING OPTION

W. H. WEAVER, *Adviser*

Industrial engineering is concerned with the engineering aspects of the organization, operation and management of manufacturing plants. It is based on the premise that the operation of a

manufacturing plant is fundamentally an engineering activity. Consequently, the industrial engineering curriculum is built on a foundation of mechanical engineering. To the technical knowledge and scientific attitude developed through the study of engineering is added the study of certain courses in the humanities, in economics, and in management.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 25, or Psych. 26	3	Psych. 26 or Econ. 25	3
Mech. Eng. 65, Heat Engin.	3	Mech. Eng. 66, Heat Eng.	3
Civ. Eng. 53, Strength of Mat'l.	3	Civ. E. 52, Appld. Mech.	
Elec. Eng. 61, Prin. of Elec. Eng.	4	(Kinetics)	3
Acct. 25, Prin. of Bus.	3	Elec. Eng. 62, Prin. of E. E.	4
Ind. Engin. 51, Ind. Mgt.	3	Acct. 26, Prin. of Bus.	3
		Mech. Eng. 68, Kinematics	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 75, Fluid Mech.	3	Ec. 79, Labor Prob.	3
Ag. Econ. 79, Statistics	3	Ind. Engin. 76, Time Study	3
Mech. Engin. 79, Lab. I	2	Ind. Engin. 78, Factory Pl.	2
Mech. Engin. 83, Mach. Design	3	Ind. Engin. 80, Budget Con.	3
Ind. Engin. 75, Job Evaluation	2	Ind. Engin. 82, Work Simpli-	
Ind. Engin. 77, Prod. Control	3	cation	2
Elective	2-3	Ind. Engin. 92, Sem.	1
		Elective	2-3

SCHOOL OF HOME ECONOMICS

HELEN S. MITCHELL, *Dean*

The School of Home Economics offers several curricula which are designed to prepare students for a variety of professions as well as for successful homemaking. Professional organizations such as the American Dietetic Association set educational standards for which students may qualify. Courses in various phases of home economics are open to men as well as women.

General education is the objective of the first two years for all students but electives for sophomore year may be chosen in line with the proposed field of specialization. The several curricula offered for the junior and senior years give an opportunity for specialization with some time for electives to further the objective of general education.

When registering for the sophomore year, each student should make a decision as to which home economics curriculum she intends to follow. Some change in emphasis may be made later, but the student is often at a disadvantage if a change in the field of specialization is made later in the college career.

The program of studies for the first two years is largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Chemistry 1, General	3	Chemistry 2, General	3
Foreign Language	3	Foreign Language	3
Home Ec. 1, Introduction	3	Home Ec. 2, Cloth. Select. & Constr.	3
Physical Education 7	2	Math. 8 or 12	3
Hygiene	1	Physical Education 8	2
¹ Elective	3		

¹ Elective to be chosen from the following:

Zoology 1, recommended for majors in Foods and Nutrition, Pre-research, or Child Development.

History 5, recommended for majors in Applied Art, Textiles and Clothing, and Merchandising.

Math. 7. May be followed by Math. 8, second semester.

Botany 1.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Economics 25, Elements	3	Psychology 26, General	3
Chem. 31, Organic	3	Chem. 32, Zool. 1 or 35 or	3
Physical Education 27	2	Bact. 31 and 31A	4
¹ Home Ec. Elective	3	Home Ec. 30, Foods	3
² Elective	3	Physical Education 28	2
		² Elective	3

¹ One of the following electives may be taken during the sophomore year: Home Ec. 31, Applied Art; Home Ec. 26, Textiles, Home Ec. 35, Clothing Construction. If none of these is elected Home Ec. 62 should be elected junior year.

² Other electives: Accounting 25, 26; Art. 31, 34; Bacteriology 31 and 31A; Chem. 29 and 30; Physics 25, 26; Econ. 26; Government 25;; Sociology 28; Zoology 35; Language.

JUNIOR-SENIOR CURRICULA IN HOME ECONOMICS

A student may specialize in one of several fields of Home Economics during the junior and senior years. In consultation with her faculty adviser, each student will choose courses directly related to her objective. To qualify for a B.S. degree in Home Economics a student during the junior and senior years must have a minimum of 15 credits and not more than 42 credits in the School of Home Economics, 30 of which are in the major field. The following courses or their equivalent are required for all majors: Home Economics 51, 52, 75, 77. The following curricula are suggestive. Those interested in other types of professional work should consult with advisers about desirable electives. For students not interested in professional work, a more liberal choice of electives is possible.

CHILD DEVELOPMENT AND FAMILY LIFE EDUCATION

Students interested in child development, nursery school work and social service work should choose this curriculum. The University is affiliated with the Merrill-Palmer School in Detroit which specializes in education for home and family life. One or two outstanding students may be selected each year to study there for one semester of the senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 70, Child Developm't	3
Psych. 55, Educational	3	Home Ec. 80, Family	3
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 85, Nursery Sch. Mgt.	3	Home Ec. 83, Teaching	3
Home Ec. 81, Methods	3	Home Ec. 77, Household Mgt.	3
Home Ec. 95, Child Nutr.	3	Electives	9
Electives	6		

FOODS AND NUTRITION AND INSTITUTION MANAGEMENT

This curriculum prepares for the professional fields of hospital or administrative dietitian or nutritionist and meets the requirements of courses approved by the American Dietetic Association. This curriculum is also advised for those interested in home service and commercial demonstrating related to foods.

Bacteriology 31 and 31A and Zoology 35 should be elected sophomore year to satisfy requirements of the American Dietetics Association.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Food Selection	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Household Equip.	3
Home Ec. 81, Methods	3	Home Ec. 70, Child Develop.	3
Chem. 79, Biochemistry	4	Electives	6
Acct. 25, Bus. Acct.	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 71, Retail Fd. Buy.	3	Home Ec. 77, Home Mgt.	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutr. Sem.	1
Home Ec. 91, Institution. Mgt.	3	Home Ec. 92, Inst. Mgt.	3
Home Ec. 93, Experimental Fds.	3	Electives	9
Elective	3		

PRE-RESEARCH IN NUTRITION

This curriculum is planned for the students who wish to prepare for graduate work in nutrition or biochemical research. The course should be planned with the advice of the Dean of the School.

Pre-research majors are advised to elect Physics 25 and 26, and take Chemistry 29 in place of Chemistry 31 in the sophomore year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Equipment	3
Chemistry 30, Quantitative	4	Electives	6
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 79, Biochemistry	4	Home Ec. 77, Home Management	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutrition Sem.	1
Home Ec. 93, Experimental Foods	3	Home Ec. 98, Special Problems	3
Home Ec. 95, Child Nutrition	3	Electives	9
Elective	3		

HOME ECONOMICS EDUCATION AND EXTENSION

Preparation for teaching demands the same basic courses whether a student plans to teach adults or 4-H club groups in Extension, or young people at the high school or junior high school level. In addition to courses required of all home economics students, certain electives are recommended for those planning for any form of teaching. Courses in speech and writing are important. Electives should be chosen in line with special interests or needs. Teachers should be ready to teach some subject other than home economics if demanded; extension workers need special work in rural sociology and adult education. Camp teaching or apprentice training is recommended between junior and senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Foods	3
Home Ec. 31, Applied Art or		Home Ec. 60, Equipment	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home Furnish. or	
Home Ec. 75, Ec. of Household	3	Home Ec. 26, Textiles	3
Home Ec. 81, Methods	3	Home Ec. 70, Child Develop.	3
Education 53, Tests & Measrmts.	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2d Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 80, Family Life	3
Home Ec. 91, Institution Mgt.	3	Home Ec. 83, Student Teaching	3
Home Ec. 93, Experimental Foods	3	Electives	9
Psychology 55, Educational	3		
Elective	3		

Any of these junior-senior courses may be taken either year.

MERCHANDISING AND RETAILING

This curriculum is planned in cooperation with the School of Business Administration and provides an opportunity for girls interested in preparing for the merchandising field. The junior and senior curriculum includes courses in home economics and in business administration, and should be planned with the faculty adviser by the end of the freshman year if possible. Students choosing this program are expected to take Home Economics 31, Accounting 25, and Economics 26 in the sophomore year, and should plan on at least a year of in-service training after college. If the interest is primarily in business, see the Merchandising major under the School of Business Administration.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 26, Textiles	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Mktg. 54, Salesmanship & Mgt.	3
Mktg. 53, Mktg. & Mktg.		Electives	6
Problems	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 87, Tailoring	3	Home Ec. 77, Home Management	3
Mktg. 71, Retail Merchandising	3	Home Ec. 88, Dress Design	3
Mktg. 73, Advertising	3	Mktg. 72, Mktg. Research	3
Electives	6	Electives	6

TEXTILES, CLOTHING, AND RELATED ART

This curriculum is of interest to students who may wish to use clothing and related art in a general and aesthetic sense for their personal and family development. Students with ability and professional interest in the artistic and technical aspects of textiles, clothing, and related art are encouraged to go further in this field. They are expected to take Home Economics 31 and Home Economics 26 in the sophomore year. Art 31 is recommended.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 53, Nutrition	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home Furnishing	3
Home Ec. 75, Ec. of Household	3	Electives	9
Home Ec. 81, Methods	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 88, Dress Design	3
Home Ec. 83, Teaching	3	Home Ec. 98, Problems	3
Home Ec. 87, Tailoring	3	Electives	9
Electives	6		

DEPARTMENTS OF MILITARY SCIENCE AND AIR SCIENCE AND TACTICS RESERVE OFFICERS' TRAINING CORPS

LIEUTENANT COLONEL L. R. ADAMS, JR., *P M S & T, Head*

LIEUTENANT COLONEL J. G. DEHORN, *P A S & T, Head*

Under act of Congress, July 2, 1862, the College was required to provide a two-year course in military instruction under a regular army officer. All able-bodied four-year male students were required to take this course. Under act of Congress, June 3, 1916, as amended by act of Congress, September 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following World War I, under an act of Congress, July 19, 1918, the Reserve Officers' Training Corps was in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics. Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a horse cavalry unit. The cavalry unit continued training until June, 1943, at which time the Advanced Course ROTC was discontinued for the duration of World War II. From September, 1943 through June, 1946 the Reserve Officers' Training Corps conducted courses in the basic course, branch immaterial only. In September, 1946, the Advanced Course ROTC was reinstated with an Armored Cavalry unit and an Air Force unit. In the fall of 1951 the two units were reorganized as two separate departments.

The primary objective of the Reserve Officers' Training Corps is to provide systematic training at civil educational institutions and to produce junior officers who have the qualifications and attributes essential to their progressive and continued development as officers in the Army of the United States or the United States Air Force. It is intended to attain the objective during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers.

All male candidates for a degree in the four-year course, except veterans of World War II, must take the basic course (Air or Army) of at least three hours a week for two years. Veterans of World War II are not required to take the basic course, but are eligible to apply for the Advanced Course.

Specialization by air or service begins in the freshman year. The courses of instruction include theoretical and practical work in all phases of military and air science, such as military organiza-

tion, hygiene and first aid, weapons, maps, military administration, world political geography, military law and boards, and leadership, drill and exercise of command. Approximately forty per cent of the course is classroom and sixty per cent practical work.

Students who are approved by the president of the University and the professor of military science and tactics or the professor of air science and tactics may elect to take the advanced course in their junior and senior years and may enroll in either the armored cavalry unit or air force unit. Advanced students will be commissioned in the organized reserve corps, in the respective branch, upon graduation. Honor graduates are offered a commission as 2nd Lieutenant in the Regular Army or Regular Air Force. Other graduates may elect to serve for one year extended active duty and by this means win a commission in the Regular Army or Regular Air Force.

The advanced course, in either branch, consists of at least five hours per week, and an advanced summer camp of about six weeks during the summer vacation between the two years of the advanced course. Students taking the advanced course are paid by the Department of the Army or Department of the Air Force, at a rate equivalent to the value of the garrison ration, which at the present time is 90c per day, or about \$27.00 per month. Advanced students are given an allowance of \$90.00 toward the purchase of a uniform to be retained by the individual. Advanced students are paid the pay of the 7th grade (private) while at summer camp.

All basic students are provided with a complete officers' uniform by the Department of the Army or the Department of the Air Force. A deposit of \$30.00 is required to cover cost of loss or damage to any articles issued.

DIVISION OF PHYSICAL EDUCATION

W. P. McGUIRK, *Head*

The Division of Physical Education includes the Departments of Athletics, Physical Education for Men, and Physical Education for Women. It offers one major, that in Physical Education for Men.

INTERCOLLEGIATE ATHLETICS

W. P. McGUIRK, *Director*

The following men are in charge of the coaching of the intercollegiate teams:

Thomas W. Eck, Head Coach of Football, and in charge of Publicity; Lorin E. Ball, Assistant Coach of Football and Coach of Basketball; L. L. Derby, Coach of Track and Cross Country;

L. E. Briggs, Coach of Soccer; Joseph R. Rogers, Jr., Coach of Swimming; Earl Lorden, Assistant Coach of Football and Coach of Baseball; Sidney W. Kauffman, Assistant Director of Athletics and in charge of Intramural Sports; Stanley F. Salwak, Coach of Tennis and Trainer.

PHYSICAL EDUCATION FOR MEN

H. M. GORE, *Adviser*

The work in the department of physical education for men includes required and elective physical fitness activity courses for all four years; and the opportunity to major the last two years in physical education; or to minor in physical education, teacher-coaching or physical recreation.

The rugged physical fitness activities courses for men, which are required the first two years and urged upon the upperclassmen are planned to help every man student to at least meet accepted reasonable minimum standards of physical fitness; and then, through regularity and continuity of progressively planned exercise, maintain good physical condition throughout his college career. Every freshman must pass a reasonable physical fitness rating and learn to swim.

The major in physical education is so planned as to qualify volunteer and professional leaders and instructors in physical education, athletics, health and safety education, and physical recreation for service and adult organization, organized summer camps, public service and industrial groups, schools and colleges.

The outline of the physical education major follows. It is contemplated that Physical Education majors will be well trained in general scientific and cultural subjects as well as to be themselves physically fit. They are urged to elect advanced military and courses in education. Those planning on teacher-coaching should take additional work in their particular subject matter fields.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 7, Algebra and Trigonometry	3	Mathematics 8, Algebra	3
Physical Education 5, Survey	3	Physical Education 22, First Aid	3
Military 1	3	Military 2	2
Physical Education 3, Activity	1	Physical Education 4, Activity	1
<i>Elect two:</i>		<i>Elect two:</i>	
Chemistry 1, General	3	Chemistry 2, General	3
Botany 1, Introductory	3	Zoology 1, Introductory	3
History 5, Mod European Civiliz.	3	History 6, Mod. European Civiliz.	3

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Economics 25, Elements	3	Psychology 26, General	3
Physical Education 45,		Physical Education 42,	
History	2	Aquatics and Water Safety	3
Physical Education 33,		Military 26	2
Activity	1	Elective* (one to be a science)	6
Physical Education 43,		Phys. Ed. 34, Activity	1
Officiating	1		
Military 25	2		
Electives* (one to be a science)	6		

* Electives to be selected from the following:

Bacteriology 31, 31A	Government 25
Chemistry 29, 31, 32	Physical Ed. 57
Physics 25, 26	History
Zoology 35	Language

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Physical Ed. 53, Elem. Schools	3	Physical Ed. 54, Special	
Physical Education 51,		Methods	3
Coaching	3	Physical Ed. 52, Coaching	3
Physical Education 63,		Physical Ed. 76, Anatomy	3
Activity	1	Physical Ed. 64, Activity	1
Electives	9	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Physical Ed. 71, Spec.		Physical Ed. 72, Special Prob. or	3
Problems or	3	Education 85, Pract. Teach.	3
Education 85, Prac. Teach.	3	Physical Ed. 78, Kinesiology	3
Physical Ed. 55, Administration	3	Physical Ed. 86, Safety Ed.	2
Physical Ed. 83, Activity	1	Physical Ed. 84, Activity	1
Electives	9	Electives	9

To comply with state certification requirements in education, physical education majors should take Education 52, Methods; Education 85, Practice Teaching, Education 88, Curriculum, and Educational Psychology 55. It is recommended, for elective education courses, that Education 51, History, Education 66, Audio-Visual Aids, or Education 83, Secondary, be taken.

PHYSICAL EDUCATION FOR WOMEN

RUTH J. TOTMAN, *Adviser*

The courses in physical education for women are planned to provide recreative activity, to develop body grace and efficiency, and to increase health and vigor. No major is available.

The first and second year women students are required to take physical education three times a week and are given two credits for each semester of satisfactory work. Third and fourth year students may elect Physical Education 61-62 or 81-82.

Girls who are restricted from unlimited activity are placed in classes suitable to their ability. Girls who are restricted from all class activity are assigned to rest periods three times a week and receive their regular physical education credit for satisfactory attendance. A similar rest program is substituted for the regular activity program when girls are temporarily incapacitated.

DIRECTORY OF COURSES

This section contains a list of courses offered in the regular sessions of the University. Course descriptions are arranged alphabetically according to subject matter fields. If any course cannot be found readily, refer to the General Index in the back of the catalogue. A separate bulletin will outline those available during the summer. The University reserves the right to withdraw any course for which an insufficient number of students enroll.

Courses are designated by numbers as follows: freshman 1-24 inclusive; sophomore 25-49 inclusive; junior 50-74 inclusive; senior 75-99 inclusive. Odd numbers designate courses given in the first semester, even numbers those offered during the second. Credit is indicated in terms of semester hours. Where possible, the class schedule follows the course description. A complete schedule of class hours is published at the beginning of each semester.

Students are referred to the section on Divisions of Study and Curricula for a statement of graduation requirements and majors available.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

PROFESSOR LINDSEY, PROFESSOR BARRETT,
ASSISTANT PROFESSOR RUSSELL, MR. CALLAHAN

26. (II) ECONOMICS OF AGRICULTURAL PRODUCTION.—This course considers the principles of production economics. An analysis of specialization, comparative advantage, diminishing, constant, and increasing costs and returns applied to the individual establishment as well as to the nation. A careful study of the combination of the factors of production is made considering the individual's adjustment when operating under monopolistic competition, laissez-faire, and monopoly. Finally, dynamic and static factors are considered in relation to their effects on the individual's production, on the economy of cities and nations, and on the international economy.

3 class hours.

8:00-8:50 M. W. F.

Prerequisite, Economics 25.

Credit, 3.

MR. BARRETT.

55. (I) MARKETING FARM PRODUCTS.—Not open to students who have taken or are taking Marketing 53. An analysis of present and past systems of assembling, transporting, distributing, and grading agricultural products. Such aspects as the adjustment of production and consumption, price formation, channels of distribution, price differentials and margins, public policy, market reporting and forecasting, and a study of the marketing of major agriculture products are considered. Geographic, future, and quality differentials are studied from the agricultural and commercial standpoint. A field trip may be arranged.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

THE DEPARTMENT.

56. (II) THE FUNDAMENTALS OF COOPERATION.—A study of the philosophy and principles of cooperation in Europe and in the United States. The history of cooperation, legal consideration, management, financing, membership relations, methods of formation, sales methods and policies are given full attention. Progress in the cooperative marketing of different agricultural products is studied. One field trip required.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. CALLAHAN.

57. (I) AGRICULTURAL CREDIT AND LAND APPRAISAL (1950-51).—A study of the development, use, functions, and operations of public and private credit institutions which are available to agriculture. Special emphasis is given to the practical aspects of credit policy and land appraisal. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

71. (I) AGRICULTURAL ECONOMIC THEORY (1951-52).—The course is a comparative and critical study of the significant contributions of the leading economists to the theory of agricultural economics from the time of Adam Smith to the present. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

75. (I) FARM ORGANIZATION AND MANAGEMENT.—This course analyzes the functions of the farmer as a business proprietor. Both the external and internal economic forces affecting the farm business are considered, such as selection and combination of factors of farm production, choice and combination of farm enterprises, the economical use of funds, the nature of farming costs, adjusting farm production to markets and prices, and the management of equipment and labor.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. BARRETT.

Prerequisite, Agricultural Economics 26.

76. (II) ADVANCED FARM ORGANIZATION AND MANAGEMENT.—The use of farm records and accounts as a basis for planning and budgeting is emphasized. Measures of success and factors in success in farming, and work simplification as applied to efficient farm techniques are considered. The last part of the course will be given over to the specific study of selected farms and the practical application of the principles and practices already discussed. Field trips are required at an estimated cost of not over five dollars.

1 class hour; 1 4-hour laboratory period.

Credit 2.

10:00-10:50 Th.; 1:00-4:50 M.

Mr. BARRETT.

Prerequisite, Agricultural Economics 75.

78. (II) PRINCIPLES AND PROBLEMS OF LAND ECONOMICS.—A study of the major contributions by outstanding economic writers to theoretical land economics; a review of American land policies; a presentation of the principles, techniques, and objectives involved in modern land use planning; and a discussion of contemporary land problems in the United States.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

79. (I) and (II) PRINCIPLES AND METHODS OF STATISTICS.—Methods of collecting, analyzing, interpreting, and presenting statistical data. Sampling principles, averages, dispersion, measures, index numbers, time series and simple correlation are specific fields covered. Practical problems in statistical analysis are given in the laboratory.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LINDSEY, Mr. RUSSELL.

80. (II) ADVANCED STATISTICS.—This course is primarily devoted to linear and curvilinear multiple correlation analysis. Machine and short-cut graphic methods are used. Some time will also be devoted to probability and analysis of variance.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 1:00-2:50 M. F.

Mr. LINDSEY, Mr. RUSSELL.

83. (I) ADVANCED FARM OPERATION.—For seniors specializing in agriculture; others by permission of instructor. A study of the efficiency of operations on a specific farm.

3 hours or equivalent.

Credit, 3.

Hours by arrangement.

Mr. BARRETT.

89. (I) 90. (II) SEMINAR IN AGRICULTURAL ECONOMICS.—A study of special problems in agricultural policy, agricultural institutions, market and price analysis.

Credit, 1-3.

Hours by arrangement.

The DEPARTMENT.

AGRONOMY

Professor COLBY, Associate Professor DICKINSON, Assistant Professor THAYER, Assistant Professor EVERSON, Mr. ZAK, Mr. CORNISH, Mr. PARSONS.

2. (II) SOILS.—This is an elementary course relating soils and their management to crop growth. This course is designed to give the student a broad background in soil science and its direct application to practical field problems. The course itself is presented with the object of introducing to the student the properties of soils and their influence upon the production of crops. The laboratory work consists of investigation of the fundamental characteristics of soil and basic principles of fertilizer and liming practices.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 W. or Th.

Mr. EVERSON, Mr. ZAK, Mr. RUSSELL.

51. (I) FIELD CROPS.—A study of the field crops of the United States which will include their uses and improvement, with their soil and climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, fertilizing, seeding methods, tillage, disease and insect control, and to methods of harvesting

and storage. As an individual problem, each student must make a detailed plan of crop production for the actual conditions of some New England farm.

2 class hours; 1 2-hour laboratory period.
9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Credit, 3.
Mr. THAYER.

52. (II) SOIL UTILIZATION.—The relationship of climate and native vegetation to the broader aspects of soil formation is described. Man's use of land resources is connected to show how the agricultural background of settlers has been active in soil use and abuse. Soil erosion control and its significance to permanent agriculture is considered.

3 class hours.
8:00-8:50 M. W. F.

Credit, 3.
Mr. EVERSON.

57. (I) SOIL FORMATION.—The first part of this course considers those physical, chemical, biological, climatic and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States is discussed.

3 class hours.

Credit, 3.
Mr. EVERSON.

77. (I) CROP IMPROVEMENT.—Theory and practice of the improvement of field crops by breeding and selection.

2 class hours; 1 2-hour laboratory period.
Hours by arrangement.

Credit, 3.
THE DEPARTMENT.
Prerequisites, Agronomy 51, Pomology 52, Zoology 53.

78. (II) FERTILIZERS AND SOIL FERTILITY.—The primary purpose of this course is to relate soils and fertilizers to plant growth. Studies are made of fertilizer practices in the United States and Europe. In the early part of the course consideration is given to the history of fertilizer development, with special emphasis upon early discoveries and causes of failure in early research. Later in the course, studies are made of factors which relate fertilizers and soils to plant growth. Fertilizer formulation technology and practice are considered in detail in the laboratory phase of this course.

2 class hours; 1 2-hour laboratory period.
9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Credit, 3.
Mr. EVERSON.

79. (I) SOIL PHYSICS.—For seniors specializing in agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. EVERSON.

81. (I) 82. (II) SPECIAL PROBLEMS IN AGRONOMY.—For seniors specializing in agronomy. This course is designed to acquaint students with agronomic research methods and practical agronomic procedures.

3 2-hour laboratory periods.

Credit, 3.
Mr. SIELING.

84. (II) SOIL CHEMISTRY.—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils are discussed and related to plant nutrition and microbiological activities. Colloidal aspects of soil chemical reactions and soil-plant interrelationships will be studied.

3 class hours.

Credit, 3.
Mr. SIELING.

Prerequisites; Chemistry 29; Botany 68; Agronomy 57.

84B. (II) SOIL CHEMISTRY LABORATORY.—Primarily for seniors majoring in agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 84.

2 3-hour laboratory periods.

Credit, 2.
Mr. SIELING.

Prerequisites, Chemistry 29, 30; Botany 68; Agronomy 57.

Agrostology.

53. (I) AGROSTOLOGY.—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highway, airport and cemetery turf.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. DICKINSON.

56. (II) AGROSTOLOGY.—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises are arranged.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. DICKINSON.

ANIMAL HUSBANDRY

Professor RICE, Associate Professor FOLEY, Assistant Professor COWAN,†
Assistant Professor HALE, Assistant Professor PORTER, Mr. ELLIOT,
Mr. MITCHELL.

1. (I) AGRICULTURE.—This course is designed to provide the student with a perspective of the whole field of agriculture, both in the old and the new world. It will endeavor to orient the student relative to the

† On leave of absence

position of agriculture in relation to other primary and secondary industries and to personal and professional services. The course will introduce the student briefly to some of the physical characteristics, economic elements, social and political factors concerned with agricultural pursuits and rural living. It will attempt to assist the student in finding his or her proper niche in the broad field of agriculture.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 Tu. Th.; 1:00-2:50 M. or F.

Credit, 3.

Mr. FOLEY.

26. (II) BREEDS OF LIVESTOCK AND DAIRY CATTLE JUDGING.—This course considers the economic desirability of thirty breeds of domestic livestock. The origin, history, characteristics and distribution of the breeds of cattle, sheep, swine, and horses commercially important in the United States will be discussed.

2 class hours; 1 2-hour laboratory period.

11:00-11:50 Tu. Th.; 3:00-4:50 F.

Credit, 3.

Mr. ELLIOT.

26A. (II) JUDGING DAIRY CATTLE.—This is an intensive course in judging dairy cattle and is required of animal husbandry majors. Others may take only by instructor's permission. During April and May, trips to leading dairy cattle breeding farms will be made on Saturdays. The highest ranking students will represent the University in the Intercollegiate Dairy Cattle Judging contest at the Eastern States Exposition and the Dairy Cattle Congress at Waterloo, Iowa the following fall.

1 2-hour laboratory period, February and March, 3-5 Th.

1 4-8 laboratory period, April and May, Saturday.

Credit, 1.

Mr. ELLIOT.

51. (I) NUTRITION OF FARM ANIMALS.—This course will present the fundamental principles of animal nutrition together with the identification, composition, properties and uses of the common feed stuffs. The application of these basic principles in calculating balanced rations for all classes of livestock will be stressed, followed by practical feeding problems assigned outside the classroom. Feeding practices in use with the university livestock will be analyzed and demonstrated.

3 class hours; 1 2-hour laboratory period.

8:00-8:50 M. W. F.; 3:00-4:50 W.

Credit, 4.

Mr. ARCHIBALD.

53. (I) ELEMENTS OF MEAT PACKING.—For department majors only. The lectures will discuss the development of the modern packing industry, the history of meat inspection, the principles of meat preservation and the opportunities in this field. Laboratories include the classification of cattle, calves, sheep, and swine into proper market classes and grades and slaughtering and dressing operations with animals provided by the university farm. Wholesale and retail cuts are prepared. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

1 class hour; 2 2-hour laboratory periods.

1:00-1:50 W.; 1:00-2:50 or 3:00-4:50 M. F.

Credit, 3.

Mr. HALE.

54. (II) MEAT PROCESSING.—For students not majoring in animal husbandry, by permission of the instructor. A few periods will be devoted

to a discussion of the meat packing industry and to the preserving and care of meat products. The remainder will be spent on the classification of meat animals with practice slaughtering and the making of wholesale and retail cuts with stress on identification of retail cuts. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 Tu. Th.

Mr. ELLIOT.

56. (II) BEEF AND SHEEP PRODUCTION.—This course considers the historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially New England. Consideration will be given to types of production; systems and methods of feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and the treatment and prevention of external and internal parasites as well as common ailments.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 M. or F.

Mr. COWAN.

56A. (II) GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.—This course is given in conjunction with Animal Husbandry 56 and consists of practice in judging and selecting beef, cattle, sheep, horses, and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments. The five highest ranking students in judging will represent the university in the Intercollegiate Livestock Judging Contest at Eastern States Exposition the succeeding fall.

1 4-hour laboratory period.

Credit, 1.

8:00-12:00 S.

Mr. COWAN.

72. (II) MEAT JUDGING.—This course deals with the classification, grading and judging of carcasses and cuts of beef, veal, lamb and pork. Class work will be carried on at Amherst and nearby packing and distributing plants. The team to represent the university in the Intercollegiate Meat Judging Contest held in connection with the Eastern States Exposition will be chosen from students in this course.

1 4-hour laboratory period.

Credit, 1.

1:00-4:50 Tu.

Mr. HALE.

Prerequisites, Animal Husbandry 51 and 53 or permission of instructor.

74. (II) ADVANCED MEATS.—This course deals with the advanced techniques in preparing, preserving, and utilizing the various meat products from cattle, sheep and swine.

2 2-hour laboratory periods.

Credit, 2.

Mr. HALE.

Prerequisite, Animal Husbandry 53 or 54 and permission of instructor.

75. (I) ANIMAL BREEDING.—This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and

theories of modern genetics, and to show how such knowledge may be utilized through genetic analysis, selection, and systems of breeding for the creation of more beautiful and more efficient animal types.

3 2-hour periods.

1:00-2:50 M. W. F.

Prerequisite, Zoology 53.

Credit, 4.

Mr. RICE.

76. (II) ANIMAL BREEDING TECHNIQUES.—This course deals with the practical application of the principles of physiology of reproduction and selection to the improvement of farm animals. It includes practice in semen collection and evaluation, artificial insemination procedures and techniques, and in the study of genitalia at different stages of estrus and gestation periods in live and dead animals. Methods of easing and aiding parturition will be discussed and observed.

1 2-hour laboratory period.

3:00-4:50 Tu. or Th.

Credit, 1.

Mr. COWAN.

78. (II) DAIRY CATTLE PRODUCTION.—This is an intensive course covering all phases of dairy cattle and milk production. It affords an opportunity to seek the solution to the economic, nutritional, genetic, and managerial problems concerned in successful dairying.

4 2-hour laboratory periods.

8:00-9:50 Tu. Th.; 1:00-2:50 W., and Tu. or Th.

Credit, 4.

Mr. FOLEY.

79. (I) HORSE AND SWINE PRODUCTION.—This course is the same as Animal Husbandry 56 except that it deals with horses and swine instead of beef and sheep.

2 class hours; 1 2-hour laboratory period.

8:00-8:50 Tu. Th.; 3:00-4:50 M. or F.

Credit, 3.

Mr. COWAN.

79A. (I) ADVANCED LIVESTOCK JUDGING.—This course is devoted entirely to beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments and a team will be selected to represent the University at the Intercollegiate Livestock Judging Contest at the International Livestock Exposition in Chicago and at any other contests in which the University may occasionally or regularly participate.

1 4-hour laboratory period, first half of semester.

8:00-12:00 S.

Credit, 1.

Mr. COWAN.

Prerequisite, Animal Husbandry 56A or permission of instructor.

81. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

3:00-4:50 W. or Th.

Credit, 1.

Mr. FOLEY.

82. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

3:00-4:50 Tu. or Th.

Credit, 1.

Mr. RICE.

83. (I) ADVANCED MEAT JUDGING.—This course is a continuation of Course 72. The team to represent the University in the Intercollegiate

Meats Judging Contest held in connection with the International Livestock Exposition will be chosen from students in this course.

1 4-hour laboratory period, first half of semester.

Credit, 1.

1:00-4:50 Tu.

MR. HALE.

Prerequisite, Animal Husbandry 72 and permission of instructor.

91. (I) GENETICS AND EUGENICS.—This course, open to students other than those specializing in animal husbandry, deals with the general problems concerned in human reproduction and inheritance. The main topics studied will consist of the physiology of reproduction, the physical basis of inheritance, and the mode of transmission of human characteristics. Consideration will also be given to such questions as the causes of variation, the relative importance of genetic and environmental influences, the mechanism of sex determination as well as population trends, differential birth rates, sterilization, and kindred eugenic problems.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

MR. RICE.

BACTERIOLOGY AND PUBLIC HEALTH

Professor BRADLEY†, Associate Professor GARVEY, Associate Professor FRANCE, Assistant Professor PERRIELLO, Assistant Professor CZARNECKI, Assistant Professor ROBERTSON, Mr. LARKIN in cooperation with Dr. WALTER W. LEE, State District Health Officer; Mr. ——— and Mr. ERNEST A. SNOW of the Division of Sanitary Engineering of the Massachusetts Department of Public Health.

31. (I) and (II) INTRODUCTORY BACTERIOLOGY. LECTURES AND DEMONSTRATIONS.—Designed to present to students interested in general science, agriculture, horticulture, and home economics the fundamental concepts of bacteriological science; make microorganisms real and significant; and demonstrate their importance in the problems of agriculture, general science, industry, public health, and medicine. This course is designed to accompany Bacteriology 31A, but may be elected without it. When elected separately this course will not satisfy the sophomore science requirement and cannot be offered as a prerequisite for other advanced courses in bacteriology.

2 class hours.

Credit, 2.

12:00-12:50 M. F. or Tu. Th.

MR. BRADLEY or MR. CZARNECKI.

31A. (I) and (II) INTRODUCTORY BACTERIOLOGY. LABORATORY.—The work covers the use and care of the compound microscope, the preparation of culture media, methods of sterilizing equipment, the isolation and aseptic handling of pure cultures, simple and differential staining, bacterial classification and differential studies on type species of pathogenic and non-pathogenic bacteria. Designed to accompany Bacteriology 31.

2 2-hour laboratory periods.

Credit, 2.

MR. FRANCE, or MR. LARKIN.

Prerequisite, Bacteriology 31, previously or concurrently.

† On leave of absence

51. (I) 52. (II) **ADVANCED BACTERIOLOGY.**—A continuation of introductory bacteriology. Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The identification and differentiation of bacterial species by morphological, cultural, physiological, and serological studies; disinfectants and antibiotics. The combined courses give to the student not only a comprehensive picture of various forms of existing bacteria but develop a specialized technique for their cultivation, isolation, and identification.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 Tu. Th.

MISS GARVEY.

Prerequisite, For 51, Bacteriology 31A; for 52, Bacteriology 51.

54. (I) and (II) **WATER AND SEWAGE BACTERIOLOGY.**—Elementary bacteriology with emphasis placed upon the importance of bacteria found in water and sewage. Work will include routine analysis used in the examination of water and sewage and in the laboratory control of water and sewage treatment plants.

2 3-hour laboratory periods.

Credit, 3.

2:00-4:50 Tu. Th.

MR. PERRIELLO.

Prerequisite, Civil Engineering 77 or permission of the instructor.

55. (I) **FUNDAMENTALS OF SOIL MICROBIOLOGY.**—This course is designed for students majoring in agricultural and related fields. Subjects included will be: fundamental laboratory procedures and techniques; quantitative and qualitative microbiological analyses of various types of soils; studies on the carbon and nitrogen cycles as affected by soil microorganisms.

2 3-hour laboratory periods.

Credit, 3.

MR. FRANCE.

81. (I) **GENERAL APPLIED BACTERIOLOGY.**—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air.

1 class hour; 2 3-hour laboratory periods.

Credit, 4.

1:00-3:50 M. F. or 1:00-3:50 W.; 9:00-11:50 S.

MR. FRANCE.

Prerequisite, Bacteriology 51 or permission of the instructor.

82. (II) **FOOD BACTERIOLOGY.**—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation and spoilage of foods, (2) the sanitary examination of foods, (3) the causes of food poisoning, and (4) microbiological assays.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F. or Tu. Th.

MISS GARVEY.

Prerequisite, Bacteriology 51 or permission of the instructor.

85. (I) **BACTERIOLOGY (IMMUNOLOGY).**—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quanti-

tative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F.

Miss GARVEY.

90. (II) **SANITARY BACTERIOLOGY.**—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies.

1 4-hour and 1 2-hour laboratory period.

Credit, 3.

1:00-4:50 M., 1:00-2:50 F.

Mr. FRANCE.

Prerequisite, Bacteriology 81.

92. (II) **CLINICAL LABORATORY METHODS.**—This course is designed for students majoring in medical technology. The purpose of the course is to familiarize the student with routine clinical laboratory procedures.

1 4-hour laboratory period.

Credit, 3.

1:00-4:50 W., 3:00-4:50 F.

Mr. FRANCE.

Prerequisites, Bacteriology 85; Zoology 35, 69.

93. (I) 94. (II) **PROBLEMS.**—Qualified seniors who have obtained permission from the department may arrange for independent work on special problems in bacteriology.

Credit, 3.

THE DEPARTMENT.

Public Health

61. (I) 62. (II) **GENERAL AND COMMUNITY SANITATION.**—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th., 12:00-12:50 F. or 10:00-10:50 M. W. F.

Mr. BRADLEY or Mr. PERRIELLO.

63. (I) **INDUSTRIAL HYGIENE AND SANITATION.**—A comprehensive study of the practices and principles of industrial processes which may constitute problems in sanitation; industrial wastes, smoke abatement, and the health of the worker. Subject matter includes organization of programs and the formation of policies for the inspection of sanitary and mechanical facilities of factories, food processing plants and other industries.

3 class hours.

Credit, 3.

Mr. PERRIELLO.

64. (II) **MICROSCOPY OF WATER.**—A study of microscopic forms of life exclusive of the bacteria. Counting and control of plankton in potable waters. Elements of limnology.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 8:00-9:50 or 10:00-11:50 W

Mr. SNOW.

Prerequisite, Bacteriology 31A.

66. (I) and (II) **PRINCIPLES OF SANITATION.**—The application of sanitary engineering and related sanitary sciences to health problems in the environment of urban and rural communities.

2 class hours.

Credit, 2.

11:00-11:50 Tu. Th.

Mr. PERRIELLO.

Prerequisite, Civil Engineering 77 or permission of the instructor.

84. (II) **PUBLIC HEALTH ADMINISTRATION.**—Admission by approval of the instructor. The organization, function, and administration of governmental health agencies; the relationship of official and volunteer health agencies; preparation and presentation of lectures, demonstrations, and exhibits. Public health laws, regulations, and sanitary codes, their origin and enforcement.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. PERRIELLO.

86. (II) **FIELD STUDIES IN SANITATION.**—Trips will be taken into the field for the observation of public health practices in sewerage; sewage treatment and disposal; the production and purification of public water supplies; housing and slum clearance; insect and rodent nuisances; milk production, handling, and distribution; garbage and refuse collection and disposal; slaughter houses and rendering plants; cold storage warehouses; and bakery and restaurant sanitation. A comparative study of urban and rural services will be made. Although transportation will be furnished, students are expected to finance their own meals.

1 class hour; 1 4-hour laboratory period.

Credit, 2.

Hours by arrangement.

Mr. BRADLEY.

Prerequisites, Public Health 61 and 62.

88. (II) **EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.**—Admission by approval of the instructors. Consideration of the factors involved in the spread of infections; a detailed discussion of the communicable diseases, their distribution, cause, epidemiology, and means of prevention and control. The use of vaccines, serums and drugs for prevention and treatment. Mass immunization programs.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. LEE.

BOTANY

Professor KOZLOWSKI, Professor TORREY, Associate Professor LIVINGSTON, Assistant Professor BANFIELD, Mr. SPENCER, Mr. PUTULA, Mr. ANDERSON.

1. (I) and (II) **INTRODUCTORY BOTANY.**—The course sets forth a body of facts dealing with the morphology and physiology of plants which is not only a foundation for future professional work in biological science, but of intrinsic value to the educated layman. The topics of seed germination, ecological adaptations, floral structures, taxonomy, botanical history, cytology, wood-anatomy, plant physiology, and plant reproduction receive appropriate elementary treatment. The lectures attempt to interpret the facts of plant structure and function in the light of the major biological principles.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. TORREY.

25. (I) CRYPTOGRAMIC BOTANY.—Selected forms typifying the slime-molds, bacteria, algae, fungi, lichens, liverworts, mosses and fernworts. The course has a two-fold purpose: (1) it is intended for students who desire to extend their knowledge to the principal branches of the plant kingdom, thus rounding out a general course of which Course 1 constitutes the first part; (2) it is also planned as an introduction to certain advanced courses for which it is prerequisite.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. SPENCER.

Prerequisite, Botany 1.

26. (II) SPRING FLORA.—Designed primarily to acquaint the student with the local spring flora through the identification of the commoner tracheate plants (lycopods, horsetails, ferns, gymnosperms, angiosperms) and the families they represent. In addition, laboratory and field work will include the study of native woody plants in the winter condition; the techniques of collection; the use of a standard manual in the identification of plants; and the preparation of a representative herbarium. The course is designed for students majoring in botany, forestry, floriculture, recreational leadership, and wildlife management. Enrolment limited to 40. Expense of required materials approximately \$20.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 Tu.; 1:00-2:50 Tu. Th. or 1:00-2:50 W. F.

Mr. HODGE.

Prerequisite, Botany 1; Botany 25 recommended.

28. (II) PLANT PHYSIOLOGY.—Only for students intending to major in forestry. The processes occurring in plants with special emphasis on tree physiology and its relation to forestry problems.

3 class hours.

Credit, 3.

Mr. KOZLOWSKI.

51. (I) PLANT PATHOLOGY.—A basic course in plant pathology dealing with the nature, cause and control of plant disease. Particular attention is given to disease symptoms, the phenomena of infection and of parasitism, the sources of inoculum, the agents of disease transmission, the relation of environment to disease incidence and development and to general principles of plant disease control. The laboratory phase is devoted to intensive study of a relatively few representative diseases induced by bacteria and fungi of the various classes.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 3:00-4:50 Tu. Th.

Mr. BANFIELD.

52. (II) ADVANCED PLANT PATHOLOGY (1952-53).—An extension of Course 51. The objective is that of providing the student with a general knowledge of the more common and representative plant disease problems. Students are granted the option in the laboratory of specializing in disease problems in their major field of interest. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 3:00-4:50 Tu. Th.

Mr. BANFIELD.

Prerequisite, Botany 51.

53. (I) FALL FLORA.—This course, a continuation of Botany 26, is designed for those students in the several fields of natural history who desire a fuller knowledge of the local flora than can be gained in the Spring. Emphasis will be placed on the identification of important families and species of flowering plants of the late summer and fall and on the thorough use of Gray's Manual of Botany. Primarily a field and laboratory course, the first part of the semester will be devoted to intensive collecting in the field followed by identification of these collections in the laboratory.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. HODGE.

Prerequisite, Botany 26.

58. (II) MICROTECHNIQUE.—A course in the preparation of microscopic mounts including the celloidin and paraffin methods and involving the use of microtomes and of differential stains. Enrolment limited to ten students.

2 2-hour laboratory periods.

Credit, 2.
Mr. TORREY.

1:00-2:50 Tu. Th.

Prerequisite, Botany 25.

59. (I) 60. (II) THE ANGIOSPERMS (1952-53).—Alternate with Courses 61 and 62. The angiosperms are here treated from the standpoints of their structure and evolution, their taxonomy, their habits and distribution, and their economic or other special appeal to man's interests. Representatives of the dominant families, both temperate and tropical, are studied in the laboratory. The course is designed for students who want a broad knowledge of the flowering plants of the world.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. TORREY.

Prerequisite, Botany 1.

61. (I) 62. (II) THE COMPARATIVE ANATOMY OF GREEN PLANTS (1951-52).—Alternate with Courses 59 and 60. The first semester is devoted to algae and mosses; the second to tracheates, including the extinct forms.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. TORREY.

10:00-10:50 M. F.; 1:00-2:50 W.

Prerequisite, Botany 25.

63. (I) COMPARATIVE MORPHOLOGY OF FUNGI—BASIDIOMYCETES AND FUNGI IMPERFECTI (1953-54).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. BANFIELD.

9:00-9:50 F.; 3:00-4:50 M. F.

64. (II) COMPARATIVE MORPHOLOGY OF FUNGI—PHYCOMYCETES AND ASCOMYCETES (1951-52).—The lectures deal with the comparative mor-

phology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu.; 10:00-10:50 Th.; 3:00-4:50 M.

Mr. BANFIELD.

66. (II) GENERAL MYCOLOGY.—A survey course in mycology designed to acquaint the student with the various classes of fungi, the life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, their utilization in industrial fermentations. The laboratory phase is devoted to a study of common representative forms and practice in the use of keys for their identification.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Mr. BANFIELD.

67. (I) 68. (II) INTRODUCTORY PLANT PHYSIOLOGY.—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth. Topics include colloidal systems, osmotic phenomena, absorption, transpiration, and internal water relations of plants, photo-synthesis, fat and protein synthesis, digestion, translocation, respiration, and growth. This is a basic course for students planning for advanced work in any branch of plant science.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 3:00-4:50 M. W. or Tu. Th.

Mr. KOZLOWSKI.

75. (I) METHODS IN PLANT PATHOLOGY (1952-53).—A course in the general techniques and specialized methods used in the investigation of plant diseases, including isolation, culture and pathogenicity studies of representative plant pathogens, the preparation and sterilization of various culture media, elementary staining and histological techniques, the use of the microscope, study of fungicides, and training in elementary photographic procedures. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

2:00-2:50 Tu.; 10:00-11:50 Tu.; 3:00-4:50 F.

Mr. BANFIELD.

Prerequisite, Botany 51.

77. (I) 78. (II) ADVANCED PLANT PHYSIOLOGY (1951-52).—Advanced study in physiology. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Hours by arrangement.

Mr. KOZLOWSKI.

Prerequisites, Botany 67, 68; Chemistry 51, 52.

81. (I) PLANT ECOLOGY.—A general survey of the relationship of plants to their environment including a study of environmental factors (autecology)—soil, water, temperature, light, atmosphere, and the biotic factors—and of plant communities (synecology) with special emphasis on the structure and succession of plant communities in North America.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LIVINGSTON.

Prerequisite, Botany 1; Botany 26 recommended.

82. (II) PLANT GEOGRAPHY.—A survey of descriptive and historical plant geography as well as the basic principles governing the natural distributions of plants. Included as topics are problems of dispersal and migration, endemism, species senescence, discontinuous distributions, polyphe-
 phesis, continental drift, and geographical aspects of polyploidy. The course is designed for advanced undergraduates or qualified graduate students.

2 class hours.

Credit, 2.
 Mr. HODGE.

Prerequisite, Botany 81 or equivalent recommended.

85. (I) 86. (II) PROBLEMS IN BOTANY.—Supervised problem work for qualified students.

Hours by arrangement.

Credit, 1-3.
 THE STAFF.

88. (II) PLANT CYTOGENETICS.—The interpretation of hereditary phenomena in plants in terms of cell structures. A correlation of plant cytology and genetics which is of applied as well as theoretical importance. 1 class hour; 2 2-hour laboratory periods.

Prerequisite, Zoology 35 or equivalent.

Credits, 3.
 Mr. SPENCER.

90. (II) INSECT TRANSMISSION OF PLANT DISEASES.—The intricate interrelationships of insects and microorganisms with particular emphasis on the basic role played by insects in inception, distribution and perpetuation of plant diseases.

3 class hours.

Credit, 3.
 Mr. BANFIELD.

BUSINESS ADMINISTRATION

Professor GAMBLE, Professor HARDY, Professor KIMBALL, Associate Professor COLWELL, Assistant Professor HEFNER, Assistant Professor HOWARD, Assistant Professor SCHOEFFLER, Assistant Professor HOAR*, Assistant Professor SCHEMPP, Assistant Professor SMART, Mr. HUMMEL, Mr. SINGER, † Mr. LUTKE, Mr. RIVERS.

Accounting.

25. (I) PRINCIPLES OF BUSINESS ACCOUNTING.—This course aims to give the student a working knowledge of the principles underlying the accounting system in the gathering, analysis, and interpretation of accounting data. The managerial uses of accounting as a means of business control are the keystone of the course.

1 class hour; 2 2-hour laboratory periods.

2:00-2:50 or 3:00-3:50 W.; 1:00-2:50 or 3:00-4:50 M. F.

Credit, 3.

Mr. COLWELL, Mr. HEFFNER, Mr. SMART.

26. (II) PRINCIPLES OF BUSINESS ACCOUNTING.—This course covers the problems of partnership and corporation accounting. Considerable

* On leave of absence for military service

† On leave of absence

time is spent on problems in amortization, depreciation, and the preparation, analysis and interpretation of financial statements.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
2:00-2:50 W.; 1:00-2:50 M. F.

Mr. COLWELL, Mr. SINGER.

71. (I) ADVANCED ACCOUNTING.—A fuller treatment of the accounting and financial problems of business units, including illustrative problems and case material.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. SMART.

Prerequisite, Accounting 26.

72. (II) ADVANCED ACCOUNTING.—A continuation of Accounting 71.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. SINGER.

Prerequisite, Accounting 71.

73. (I) COST ACCOUNTING.—The application of accounting techniques to industrial costs.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. COLWELL, Mr. SCHOEFLER.

Prerequisite, Accounting 26.

74. (II) ACCOUNTING SYSTEMS.—The application of accounting principles to representative types of business and the study of Federal Income Tax and Social Security accounting problems.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Prerequisite, Accounting 73. Mr. COLWELL.

75. (I) ADMINISTRATIVE ACCOUNTING AND CONTROL.—The preparation and analysis of budgets, reports, and internal checks, using accounting techniques and data, as control devices in business and industry.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Prerequisites, Accounting 25 and 26. Mr. COLWELL.

76. (II) AUDITING.—A course in the interpretation of accounting records dealing with theory and procedure. C.P.A. and American Institute of Accountants examination problems are studied.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Prerequisite, Accounting 72 and 73. Mr. COLWELL.

Finance

53. (I) MONEY, BANKING AND CREDIT.—A critical survey of the development and operation of the monetary and banking systems of the United States.

3 class hours. Credit, 3.
Mr. GAMBLE, Mr. KIMBALL, Mr. LUDTKE.

65. (I) CORPORATION FINANCE.—An introductory course in business finance concerned with forms of ownership organization, the nature and uses of corporate securities, provision and maintenance of capital, financial expansion, and corporate reorganization.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. RIVERS.

76. (II) INSURANCE.—A general course concerning certain risks to which individuals and business enterprises are exposed and the methods and institutions evolved to insure against loss arising from these hazards.

3 class hours.

Credit, 3.

Mr. LUDTKE.

78. (II) PUBLIC FINANCE.—Principles of public revenues and expenditures with special emphasis on the systems and problems of taxation.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. GAMBLE.

81. (I) PROBLEMS IN BUSINESS FINANCE.—A study of problems of financial management of business corporations and the effects of financial policies on the individual firm and the economy as a whole.

3 class hours.

Credit, 3.

Mr. KIMBALL.

Prerequisite, Finance 65.

82. (II) INVESTMENTS.—The principles and techniques that are useful for the analysis and selection of investment media; investment policies of individuals and institutions.

3 class hours.

Credit, 3.

Mr. KIMBALL.

Prerequisite, Finance 65 or consent of instructor.

Business Law

70. (II) BUSINESS LAW.—This course consists of a study of the drawing, reading, and interpretation of contracts and sales, with specific problem work. In addition, wills, commercial paper, carriers, real estate agency, public and personal rights are studied.

3 class hours.

Credit, 3.

9:00-9:50 M. F.

Mr. SMART.

71. (I) LEGAL ASPECTS OF ECONOMIC TRANSACTIONS.—A continuation of Course 70.

3 class hours.

Credit, 3.

Mr. SMART.

Prerequisite, Business Law 70.

Industrial Administration

11. (I) ECONOMIC GEOGRAPHY.—A study of the geographic distribution of natural and human resources and the economic and physiographic bases of agriculture, manufacturing, and allied industries.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. RIVERS, Mr. SCHEMP.

76. (II) PRINCIPLES OF TRANSPORTATION.—The development of high-way, waterway, railway, and air transportation, and its relation to the agricultural and industrial development of the United States; the principles governing the operation and control of transportation agencies; including training in the use of freight tariffs, classifications, routing guides and other traffic departments; the function of industrial traffic departments.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.

Mr. RIVERS.

83. (I) BUSINESS MANAGEMENT.—A study of the problems connected with the management of a business enterprise.

3 class hours.

Credit, 3.

Mr. SCHEMPP.

84. PERSONNEL ADMINISTRATION.—A study of the principles of the management of labor relations.

3 class hours.

Credit, 3.

Mr. HOWARD, Mr. SCHEMPP.

Marketing

52. (II) INDUSTRIAL PURCHASING.—A study of the purchasing problems of industrial enterprises and their market contacts with their sources of supply.

3 class hours.

Credit, 3.

Mr. HUMMEL.

53. (I) MARKETING AND MARKETING PROBLEMS.—Not open to students who have taken or are taking Agricultural Economics 55. A study of the forces and conditions which determine prices and the mechanism, methods, and problems concerned with transporting, storing and distributing economic goods.

3 class hours.

Credit, 3.

10:00-10:50 Tu. S.; 11:00-11:50 Th.

Mr. HARDY, Mr. HUMMEL.

54. (II) SALESMANSHIP AND SALES MANAGEMENT.—The principles and practices of selling and the management of selling enterprises.

3 class hours.

Credit, 3.

Mr. HARDY.

71. (I) RETAIL MERCHANDISING.—A study of the operation and productive functions of retail business.

3 class hours.

Credit, 3.

Mr. HUMMEL.

72. (II) MARKET RESEARCH.—The aims, sources and fact-gathering methods of market research activities. General study and individual research projects.

3 class hours.

Credit, 3.

Mr. HUMMEL.

73. (I) ADVERTISING.—A study of the techniques and media of advertising, its services to business and the organization and economic function of the advertising industry.

3 class hours.

Credit, 3.
Mr. HARDY.

74. (II) NEW ENGLAND MARKETS.—Individual and group study of the marketing problems of New England industrial and marketing enterprises.

3 class hours.

Credit, 3.
Mr. HARDY.

FIELD WORK IN MERCHANDISING Open only to students in the Merchandising curriculum who have been assigned to field work positions which are properly supervised. Grades in this course are based upon a report from the student's employer and a formal written report presented by the student. No academic credit is given for this course.

Mr. HARDY.

CHEMISTRY AND CHEMICAL ENGINEERING CHEMISTRY

Professor RITCHIE, Professor FESSENDEN, Professor SMITH, Associate Professor CANNON, Associate Professor LITTLE, Assistant Professor RICHASON, Assistant Professor ROBERTS, Assistant Professor STEIN, Dr. PARROTT*, Mr. CRUICKSHANK, Mr. OBERLANDER, Mr. HALL, Mr. RHYNE, Mr. SCHAFFRATH, Mr. TYLER.

1. (I) 2. (II) GENERAL CHEMISTRY.—A study of the fundamental chemical laws and theories. A considerable amount of descriptive material will be included in connection with discussions of the periodic system, atomic structure, and in various applications of the principles. The object of the course is to give the student a sound scientific training through a course in chemistry. Students who have had no previous work in chemistry will be grouped together in laboratory and recitation sections so that they may have special attention.

2 class hours; 1 quiz hour; 1 2-hour laboratory period Credit, 3.
Mr. FESSENDEN, Mr. RICHASON, Mr. OBERLANDER.

4. (II) GENERAL INORGANIC CHEMISTRY.—For students planning to major in chemistry or chemical engineering, and others who plan to continue the study of this science in preparation for their field of specialization. The course will include ionic equilibria; oxidation and reduction; electrochemistry; the descriptive chemistry of some nonmetallic and metallic elements; the metallurgy of some common metals, and a discussion of the production of some of the more important inorganic chemicals. Applications of atomic structure and the electronic theory of valence to these subjects will be stressed.

2 class hours; 1 quiz hour; 2 2-hour laboratory periods. Credit, 4.
Mr. FESSENDEN, Mr. RICHASON.

Prerequisite, Chemistry 1.

* On leave of absence for military service

29. (I) and (II) **QUALITATIVE ANALYSIS**.—A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. The laboratory work deals with the characteristic properties, reactions, and the systemic separation and identification of the common cations and anions. The semi-micro technique is used throughout for the analysis of salts, salt mixtures, and alloys. A considerable portion of the laboratory work is devoted to the identification of substances unknown to the student. This course is designed to meet the needs not only of those students specializing in chemistry, but also of those students specializing in other subjects where inorganic chemistry is of importance.

2 class hours; 6 laboratory hours.

Credit, 4.

8:00-8:50 or 10:00-10:50 Tu. Th.; 8:00-9:50 or 10:00-11:50 M. W. F. or 1:00-3:50 M. F. or 1:00-3:50 Tu. Th.

Mr. SMITH.

Prerequisite, Chemistry 2.

30. (I) and (II) **QUANTITATIVE ANALYSIS**.—The theory and practice of representative determinations, both gravimetric and volumetric. The laboratory work will include the gravimetric analysis of chloride, sulfate, and limestone, volumetric work with acids and bases, volumetric precipitation methods, and oxidation reduction titrations.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 Tu. Th.; 1:00-3:50 M. F. or Tu. Th. or 1:00-3:50 W.; 9:00-11:50 S.

Mr. ROBERTS.

Prerequisite, Chemistry 29.

31. (I) 32. (II) **ORGANIC CHEMISTRY**.—A short course intended to satisfy the requirements in this field for all students who do not specialize in chemistry.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 2:00-3:50 Th.

Mr. RITCHIE.

Prerequisites, Chemistry 1 and 2.

51. (I) 52. (II) **ORGANIC CHEMISTRY**.—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those who may specialize in other fields where a more comprehensive course is desired than Chemistry 31 and 32. The first semester deals largely with compounds of the aliphatic series, while the benzene series is taken up in the second semester. Students electing this course should take both 51 and 52.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

9:00-9:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. RITCHIE, Mr. CANNON.

Prerequisite, Chemistry 29.

63. (I) **CHEMISTRY OF WATER, SEWAGE AND SEWAGE SLUDGE**.—Admission by permission of the instructor. The preparation of reagents and standard methods for the analysis of water, sewage and sewage sludge. Lectures and discussions on the sanitary significance of analytical data.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 W.; 9:00-11:50 S.

Mr. _____

Prerequisite, Chemistry 30.

65. (I) 66. (II) PHYSICAL CHEMISTRY.—A study of the fundamental theories and laws of physical chemistry, together with the solution of problems involved in their application. The laboratory work will include practice in making physico-chemical measurements and the preparation of reports.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

8:00-8:50 or 11:00-11:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. FESSENDEN, Mr. SMITH.

Prerequisites, Chemistry 30; Mathematics 30; Physics 26.

77. (I) ADVANCED PHYSICAL CHEMISTRY.—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry.

3 class hours.

Credit, 3.

Mr. FESSENDEN.

Prerequisites, Chemistry 65 and 66.

79. (I) ELEMENTARY BIOCHEMISTRY.—A consideration of the more important facts relating to biological materials and processes. This course is designed primarily for students not eligible for courses 93 or 94. It is not open to chemistry majors and is not offered for graduate credit.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LITTLE.

80. (II) CLINICAL CHEMISTRY (Blood and Urine Analysis).—Work to be covered will include the collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of certain significant compounds in the samples. The latter group will include at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LITTLE.

81. (I) ORGANIC CHEMISTRY.—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects. Admission by permission of instructor.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. CANNON.

82. (II) QUALITATIVE ORGANIC CHEMISTRY.—The characterization of organic compounds by means of physical properties, class reactions, and the preparation of suitable derivatives. The laboratory work will involve the identification of a number of simple unknown compounds followed by the separation, purification, and identification of the individual components in several unknown mixtures of organic compounds. Admission by permission of instructor.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 2:00-4:50 Tu. Th.

Mr. CANNON.

83. (I) ADVANCED QUANTITATIVE ANALYSIS.—Designed primarily for chemistry majors, but open to others with permission of the instructor. The laboratory work will include representative determinations in electro-

lytic and electrometric methods; and an introduction to colorimetry and other optical methods of analysis. Selected topics in the use of organic precipitants, silicate analysis, analysis of steel and other alloys, fuels, oils, water, and gases will also be included.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. ROBERTS.

Prerequisite, Chemistry 30.

86. (II) THEORETICAL INORGANIC CHEMISTRY.—A survey of inorganic chemistry which is largely theoretical and includes such topics as atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.
Mr. SMITH.

Prerequisite, Chemistry 65.

88. (II) HISTORY OF CHEMISTRY.—An historical and biographical study of chemistry and chemists. The aim of the course is: (1) to give the student a comprehensive view of the science as a whole, through a study of the development of new ideas and the establishment of new theories and laws; and (2) to arouse an enthusiastic interest in the subject and an appreciation of the true spirit of scientific research, through a sympathetic presentation of the work and lives of the great chemists who have been the creators of the chemistry of today.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. RITCHIE.

92. (II) INTRODUCTION RESEARCH.—Admission only by permission of the department. The aim of the course is to give the student an opportunity to learn the purpose and methods of research. To each student is assigned some special subject or problem in one of the following fields of chemistry, viz., analytical, biochemical, inorganic, organic, physical.

10 laboratory hours.

Hours by arrangement.

Credit, 5.
THE DEPARTMENT.

93. (I) 94. (II) GENERAL BIOCHEMISTRY.—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences, and provide a background for more advanced or specialized study in this field.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.
Mr. TURNER.

Prerequisites, Chemistry 51 and 52 or their equivalent.

CHEMICAL ENGINEERING

Professor LINDSEY, Assistant Professor CASHIN, Mr. CHAKOUR.

55. (I) CALCULATIONS.—A problem course covering the applications of conservation of mass and energy in chemical processing; the ideal gas, gas mixtures, vapor pressure, the material balance, the energy balance, fuels and combustion.

3 class hours.

Credit, 3.
Mr. CASHIN.

Prerequisites, Chemistry 29, 30; Mathematics 31, 32; Physics, 25, 26.

56. (II) UNIT OPERATIONS I.—A study of the fundamental principles underlying the unit operations of fluid flow, heat transfer, evaporation, humidity and air conditioning, and drying. The general theory of mass transfer by diffusion is taken up before the study of the last two operation. Emphasis is on the quantitative aspects and on description of the types of equipment used for these operations in industry.
3 class hours.

Credit, 3.
Mr. CASHIN.

Prerequisites, Chemistry 65; Chemical Engineering 55.

57. (I) INORGANIC CHEMICAL TECHNOLOGY.—A study of the manufacture of some of the important inorganic chemicals. Topics studied include sulfuric acid, nitric acid, hydrochloric acid, ammonia, sodium carbonate, and sodium hydroxide with particular stress on unit operations. Field trips will be included where possible.
3 class hours.

Credit, 3.
Mr. CHAKOUR.

Prerequisites, Chemistry 30; Physics 26.

58. (II) ORGANIC CHEMICAL TECHNOLOGY.—A study of some of the unit processes involved in the manufacture of organic materials. Unit processes studied include nitration, amination, halogenation, oxidation, and esterification. Field trips will be included where possible.
3 class hours.

Credit, 3.
Mr. CHAKOUR.

Prerequisite, Chemistry 51.

60. (II) HEAT ENERGY RELATIONS.—A study of the energy relations in chemical processes. Includes: a review of concepts, energy balances, entropy, thermodynamic functions, properties of fluids, flow relations, compression processes, refrigeration processes, phase equilibria, reaction equilibria.
3 class hours.

Credit, 3.
Mr LINDSEY.

Prerequisites, Chemistry 65; Chemical Engineering 55.

75. (I) INSTRUMENTATION.—A detailed study of the underlying principles and practices of indicating, recording, and controlling instruments used on industrial process equipment.
3 class hours.

Credit, 2.
Mr. CASHIN.

Prerequisites, Physics 25, 26; Chemical Engineering 56.

76. (II) PROFESSIONAL SEMINAR. — Preparation and discussion of professional, economic, political, humanistic, and other topics of interest to chemical engineers. For seniors majoring in chemical engineering.
2 class hours.

Credit, 2.
THE DEPARTMENT.

77. (I) ELEMENTS OF UNIT OPERATIONS.—For other than chemical engineering majors. An introduction to some of the unit operations

of chemical engineering, especially those which may be of use in other process industries. Includes: material balance problems, movement of solids and fluids, filtration, centrifugation, extraction, distillation, gas absorption, evaporation, and drying. The emphasis is on the principles of the unit operations and the types of equipment used, rather than the quantitative aspects and the design of equipment.

2 class hours; 1 2-hour computation or laboratory period. Credit, 3.

Mr. CHAKOUR.

Prerequisites, Chemistry 65 and 66 previously or concurrently or Mechanical Engineering 63 and 64 or 65 and 66.

89. (I) CHEMICAL ENGINEERING LABORATORY I.—A quantitative study of pilot plant size equipment illustrating the unit operations. Special emphasis is placed on the securing of reliable data, correct operating techniques, and on the writing of industrial type reports.

1 3-hour period.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Chemical Engineering 56.

90. (II) LABORATORY PROJECTS.—Investigation and report on an elementary chemical engineering problem. Problems will be assigned by the staff and may include the design, construction, operation, and testing of a piece of unit operations or unit process equipment, and the submission of a final comprehensive report.

2 4-hour laboratory periods.

Credits, 4.

THE DEPARTMENT.

Prerequisites, Chemical Engineering 89, 93.

93. (I) COMPREHENSIVE PROBLEMS.—The solution of comprehensive problems which involve the application and integration of a number of the principles studied in previous courses in chemistry and chemical engineering. Particular emphasis is placed on the use of the economic balance in making decisions, such as the selection of equipment and choice of operating conditions.

2 class hours; 1 3-hour period.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 56, 60.

94. (II) COMPREHENSIVE PROBLEMS II.—The solution of problems similar to those in Course 93 will be undertaken, but in addition, will involve the application of principles studied in Course 97.

2 class hours; 2 3-hour periods.

Credit, 4.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 93, 97.

97. (I) UNIT OPERATIONS II.—A continuation of Course 56, including the additional unit operations of distillation, gas absorption, solvent extraction, crystallization, filtration, mixing, crushing and grinding.

3 class hours.

Credit, 3.

Mr. CHAKOUR.

Prerequisite, Chemical Engineering 56.

98. (II) ADVANCED UNIT OPERATIONS.—A continuation of Course 97 with particular reference to diffusion processes and multi-component distillation.

2 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisite, Chemical Engineering 97.

DAIRY INDUSTRY

Professor HANKINSON, Assistant Professor LINDQUIST,
Assistant Professor NELSON, Mr. FINNEGAN.

25. (I) GENERAL DAIRYING.—This course is introductory to all other courses in dairy industry and gives a general knowledge of the subject to those who wish to take only one course in dairying. The lecture portion includes the importance of the dairy industry, the composition and properties of milk, the secretion of milk, production of quality milk on the farm, methods of processing milk and cream, and the elements of ice cream, butter and cheese making. The laboratory work includes the testing of milk and milk products for fat and acidity, lactometry, and a general study of dairy plant equipment and processes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu. Th.; 9:00-10:50 W. or 2:00-3:50 Tu.

Mr. HANKINSON, Mr. FINNEGAN.

50. (II) JUDGING DAIRY PRODUCTS.—A study of market standards and grades of dairy products, with practice in judging milk, ice cream, butter, and cheese. The student learns to recognize quality in dairy products, to detect specific defects, and to know their causes and means of prevention. A team is chosen from this class to represent the University in two contests: Eastern States Intercollegiate Dairy Products Judging Contest, and Collegiate Students' International Contest in Judging Dairy Products.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 F.

Mr. NELSON.

52. (II) MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value, and advertising. Cultured milk and other milk drinks also are included. Some milk plants are visited, the cost of the trip not exceeding five dollars.

2 class hours; 2 2-hour laboratory periods.

Credit, 4.

8:00-8:50 Tu. Th.; 9:00-10:50 Tu. Th. or 3:00-4:50 Tu. Th.

Mr. LINDQUIST.

75. (I) DAIRY CHEMISTRY.—This course is a particular study of those physical and chemical principles which not only explain the behavior of milk and milk products in the various technological operations, but also provide a basic viewpoint for dairy research. The lectures will include

discussions (1) of the constituents of milk in relation to other organic compounds, and (2) the physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc. The laboratory work will include many of the tests used commercially and in dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-10:50 Tu.; 8:00-9:50 Th.

Mr. NELSON.

Prerequisites, Dairy 25, Dairy 52, and Chemistry 52, or permission of the instructor.

77. (I) BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of starter cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage, processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein is also covered.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 M. F.

Mr. LINDQUIST, Mr. NELSON, Mr. FINNEGAN.

Prerequisite, Dairy 25.

78. (II) ICE CREAM MAKING.—The course includes a study of the principles and practices of ice-cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished product are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 Tu. Th.

Mr. NELSON.

79. (I) 80. (II) SEMINAR.—For students specializing in dairy industry.

1 class hour.

Credit, 1.

11:00-11:50 M.

THE DEPARTMENT.

ECONOMICS

Professor GAMBLE, Professor MORRIS, Assistant Professor HALLER,

Mr. WEINER.

12. (II) ECONOMIC HISTORY OF THE UNITED STATES.—A study of the significant factors in the economic development of the nation.

3 class hours.

Credit, 3.

Mr. HALLER.

25. (I) and (II) ELEMENTS OF ECONOMICS.—Definitions and introductory principles of production, exchange, and the financial organization

of society, with a short survey of the economics of distribution and the use of wealth and income.

3 class hours.

Credit, 3.

THE DEPARTMENT.

26. (II) ELEMENTS OF DISTRIBUTION.—A continuation of Course 25 with emphasis on the study of wealth and income distribution.

3 class hours.

Credit, 3.

Prerequisite, Economics 25.

THE DEPARTMENT.

55. (I) ECONOMICS OF CONSUMPTION.—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes.

3 class hours.

Credit, 3.

Mr. HALLER.

56. (II) BUSINESS CYCLES.—A study of business fluctuations and an analysis of current business cycle theories.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. SCHOEFFLER.

70. (II) MONOPOLIES.—A study of the growth, development, and social control of monopolies.

3 class hours.

Credit, 3.

Mr. HALLER.

73. (I) MODERN ECONOMIC THEORY.—A study of current theories about value, distribution and prices.

3 class hours.

Credit, 3.

Mr. MORRIS, Mr. SCHOEFFLER.

74. (II) CURRENT ECONOMIC PROBLEMS.—An advanced course for those desirous of studying more intensively some current economic problems. Students will be encouraged to pursue lines of individual interest.

3 class hours.

Credit, 3.

THE DEPARTMENT.

77. (I) ECONOMICS OF INTERNATIONAL TRADE (1951-52). A study of the policies, principles, and practices of international trade. Given in alternate years.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. _____.

79. (I) LABOR PROBLEMS.—An analysis of the background and character of the modern labor problem with special references to the United States. Topics to be considered include: the problems of wages, hours, working conditions and unemployment; the trade union movement; and some agencies for the promotion of industrial peace.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. MORRIS, Mr. WEINER.

80. (II) LABOR LEGISLATION.—A study of federal and state legislation affecting labor.

3 class hours.

Credit, 3.
Mr. MORRIS.

83. (I) SOCIAL CONTROL OF BUSINESS.—Methods of social control of economic activity including both formal and informal controls.

3 class hours.

Credit, 3.
Mr. HOWARD.

84. (II) COMPARATIVE ECONOMIC SYSTEMS.—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economies.

3 class hours.

Credit, 3.
Mr. HOWARD.

91. (I) 92. (II) SEMINAR.—Research in economic theory; problems of labor, commerce, and industry. If desirable, some other economic study may be substituted.

1 or 2 2-hour conferences.

Credit, 1 to 3.
THE DEPARTMENT.

EDUCATION

Professor PURVIS, Assistant Professor OLIVER, Assistant Professor ROURKE,
Assistant Professor MCCARTHY, Assistant Professor WYMAN,
Mr. TAFT¹, Mr. DAYTON.

51. (I) HISTORY OF EDUCATION.—Educational movements are traced from early Greece to the present with the aim of better understanding of modern education. This is normally the beginning course for students undertaking work in Education.

3 class hours.

Credit, 3.
Mr. PURVIS.

52. (II) PRINCIPLES AND METHODS OF TEACHING.—By means of discussion, case studies, and current educational literature, teaching ideals and procedures are set up. Application of the general principles are made in the major fields represented by the class.

3 class hours.

Credit, 3.
Mr. MCCARTHY.

53. (I) EDUCATIONAL TESTS AND MEASUREMENTS.—The most serviceable tests and scales for measuring achievement are considered; test construction, administration, scoring, and interpretation of results are studied and practiced. Considerable attention is given to preparation of informal tests for diagnostic and grading purposes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. ROURKE.

¹ State Supervisor for Agricultural Teacher-Training representing the State Department of Education in the administration of vocational agricultural acts.

60. (II) ELEMENTARY SCHOOL CURRICULUM.—This course is designed to present a picture of the elementary school curriculum from the standpoint of content and methodology. Emphasis will be placed on the unit method and the activity program.
3 class hours.

Credit, 3.
Mr. _____.

61. (I) ELEMENTARY READING AND LANGUAGE ARTS.—This course will discuss and demonstrate emerging methods of preventing and remedying reading difficulties. Attention will be given to the purposes, methods, and materials of oral and written language and reading.
3 class hours.

Credit, 3.
Mr. _____.

62. (II) ELEMENTARY ARITHMETIC AND SCIENCE.—This course will discuss and demonstrate accepted methods and materials in the teaching of these subjects in the intermediate grades. Attention will be given to methods of integrating these courses into the total program of the school.
3 class hours.

Credit, 3.
Mr. _____.

63. (I) PRINCIPLES OF ELEMENTARY EDUCATION.—This course is designed to acquaint the student with the aims, organization, program, pupil population, etc., of the elementary school and the relationship between this level of education and the secondary school level which follows.
3 class hours.

Credit, 3.
Mr. _____.

66. (II) PREPARATION AND USE OF AUDIO-VISUAL AIDS.—Study is made of available media of audio-visual aids to instruction, construction of visual material, and accepted methods of use.
2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. WYMAN.

72. (II) VOCATIONAL EDUCATION IN AGRICULTURE.—The course demands certain prerequisites of experience and a definite objective on the part of the student to enter the field of vocational agricultural teaching which makes it necessary for the student to seek permission to enter the course. It is the first of the series of special courses (72, 73, 75) required of candidates for the vocational teacher-training certificate. A survey of vocational education and an introduction to teaching of vocational agriculture at the secondary school level is the basis of the course. Certain information and observations in preparation for the apprenticeship course are offered.

3 class hours.
10:00-10:50 M. W. F.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

73. (I) and (II) APPRENTICE TEACHING IN AGRICULTURE.—For a limited number of qualified candidates in vocational education. A full year in absentia normally following the junior year in college, teaching

agriculture, horticulture, and related subjects. Candidates should have completed the course in Education 72, and in Education 52, if possible, and must apply early to the instructor of the course.

Maximum credit, 6.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

75. (I) **TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE.**—By arrangement with the instructor. Preferably this course should follow Courses 72 and 73. It covers the materials, methods, policies, and special requirements of Massachusetts for teaching agriculture and related subjects in high schools and special country schools. This is one of three courses required of candidates for the agricultural teacher-training certificates.

3 class hours.

Credit, 3.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

79. (I) **METHODS IN ADULT EDUCATION.**—Admission only by permission of instructor. The beginning Education course for juniors and seniors who are training for extension work and for others interested in teaching adults. Generally accepted methods of group and individual instruction with adults, and methods of developing leaders to carry on the work in the field.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. _____.

83. (I) **SECONDARY EDUCATION IN AMERICA.**—This course presents a picture of the secondary school as a social agency, its relation to elementary and collegiate education, its aims, organizations, administration, curriculum procedures, and such other phases as are necessary to acquaint the student with the predominant level of our educational ladder.

3 class hours.

Credit, 3.

Mr. McCARTHY.

85. (I) and (II) **OBSERVATION AND PRACTICE TEACHING.**—Admission by permission of the Department. An opportunity to do regular teaching in cooperating high schools within commuting distance of the University. The student works under the supervision of a teacher with frequent visits from some member of the staff.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Education 51, 52, 83 or their equivalent.

88. (II) **THE SCHOOL CURRICULUM.**—This course discusses the curriculum of schools of this country from the point of view of the general social philosophy which created it. It seeks to make clear to the student the various controversial issues regarding such concepts as progressive education, the core-curriculum, the experience curriculum, projects, etc. An outline course of study is prepared by each student in the field he is to teach.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. ROURKE.

90. (I) and (II) **EVALUATION OF LEARNING.**—For senior majors in Education. Tests and scales for measuring ability and achievement; standard tests and interpretation of results; construction of informal tests for diagnostic and grading purposes.

3 2-hour periods the first and each alternate week.

Credit, 3.
Mr. ROURKE.

91. (I) and (II) **SECONDARY SCHOOL CURRICULUM.**—For senior majors in Education. A consideration of learning material and activities and their organization in the subjects which these students are teaching, and the preparation of courses of study in those fields in the light of accepted educational practice.

3 2-hour periods the first and each alternate week.

Credit, 3.
Mr. ROURKE.

Prerequisite, Education 51.

92. (I) and (II) **METHODS AND MANAGEMENT.**—For senior majors in Education. The basic methods underlying teaching and class management will be discussed and illustrated. The work in this course will be correlated as closely as possible with the observation and practice of the students in neighboring schools.

3 2-hour periods the first and each alternate week.

Credit, 3.
Mr. PURVIS.

Prerequisite, Education 51.

93. (I) and (II) **PRINCIPLES OF SECONDARY EDUCATION.**—For senior majors in Education. Practical problems concerning the school as a social agency, its aims, characteristics of pupil population, program of study, guidance, extra curriculum, etc., from the point of view of situations met by teachers.

3 2-hour periods the first and each alternate week.

Credit, 3.
Mr. MCCARTHY.

Prerequisite, Education 51.

94. (I) and (II) **PRACTICE TEACHING.**—For senior majors in Education. Five school days of observation and teaching each alternate week in neighboring secondary schools under supervision of competent teachers and members of the staff.

The second and each alternate week.

Credit, 5.
THE DEPARTMENT.

Prerequisite, Education 51.

AGRICULTURAL ENGINEERING

Professor STAPLETON, Associate Professor MARKUSON, Assistant Professor

TAGUE, Assistant Professor PUSHEE, Assistant Professor PFLUG,

Mr. PATTERSON.

51. (I) **HOUSE PLANNING.**—Plan designs of the small house will be made. The arrangement of interior equipment, especially in the kitchen, and lighting, heating, water supply, and sewage disposal will be studied, together with a brief history of the house materials, construction methods,

equipment, and architectural styles. Consideration will be given to the economics of house building, including financing and to maintenance and overhead expense.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. MARKUSON.

55. (I) FARM SHOP.—For students in agriculture and horticulture. Laboratory exercises cover instruction and practice in the use of carpenter's tools in construction and in bench work, arc and gas welding, pipe fitting, soldering, use of machinist's tools in machinery repair, and the mixing and placing of concrete. Classroom instruction covers materials of construction and the utilization of local and special materials for these purposes.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. PUSHEE.

71. (I) FARM POWER.—The study of internal combustion engines used in farm tractors and power units.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Engineering 65, 68.

72. (II) DRAINAGE AND IRRIGATION ENGINEERING.—This course is an abridgment of Agricultural Engineering 78 for students not majoring in Engineering who do not have the prerequisites for Course 78.

1 class hour; 1 2-hour laboratory period.

Credit, 2.
Mr. PFLUG.

73. (I) FARM STRUCTURES.—A study of the strength and durability of building materials, construction systems and the mechanical principles underlying their use in farm-construction. In the drafting room studies will be made of some major farm building and complete working drawings finished in all essential details.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.
Mr. STAPLETON.

Prerequisites, Civil Engineering 34, 51; Mechanical Engineering 61.

74. (II) FARM STRUCTURES.—This course is an abridgment of Agricultural Engineering 73 for students not majoring in Engineering who do not have the prerequisites for Course 73.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. MARKUSON.

76. (II) AGRICULTURAL MACHINERY.—The study of design and operational problems of agricultural field machinery.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Engineering 68, 83.

78. (II) DRAINAGE, RECLAMATION AND CONSERVATION.—The course covers the engineering phase of drainage and reclamation. The various

systems are studied, complete layouts established in the field, and problems of flow and run-off given.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. STAPLETON.

Prerequisites, Civil Engineering 25, 75 or 76; Agronomy 2.

80. (I) and (II) FOOD PROCESS ENGINEERING.—A study of food processing machinery and instrumentation.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. PFLUG.

82. (II) REFRIGERATION.—Fundamentals in planning and operating a refrigerated storage with particular reference to size, details of construction, cooling load, and refrigerating machinery and accessories. For non-engineering majors.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. PFLUG.

83. (I) 84. (II) AGRICULTURAL ENGINEERING PROBLEMS.—Open only to seniors specializing in agricultural engineering. This course consists of individual problems chosen by the students under guidance of the department.

Hours by arrangement.

Credit, 3.

THE DEPARTMENT.

85. (I) RURAL ELECTRIFICATION.—A course devoted to the utilization of electricity in agriculture.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. STAPLETON.

Prerequisites, Electrical Engineering 61, 62.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in agricultural engineering.

1 class hour.

Credit, 1.

THE DEPARTMENT.

CIVIL ENGINEERING

Professor MARSTON, Professor WHITE, Associate Professor OSGOOD, Associate Professor HENDRICKSON, Assistant Professor COFFEY, Mr. MARCUS, Mr. GROW, Mr. GABRYS, Mr. FENG.

25. (I) SURVEYING.—The theory of surveying for both measurement and layout work, description of field and office methods of computations, notes, and drafting procedure are given in the classroom. Topics covered are use of tape, transit, level, and plane table; methods of carrying out property surveys, layout surveys, computation and field work for simple and compound horizontal and vertical curves, determination of geographic position, determination of azimuth from the Sun and Polaris, and a finished map of a small area.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. HENDRIKSON.

Prerequisite, Mathematics 5.

27. (I) and (II) PLANE SURVEYING.—The basic principles of mensuration are discussed in class. Instruction and problems involving the use of tape, transit and level are given in the field, and the preparation of a map of a small area is carried out in the drafting room. Route surveying is considered briefly. This course is not open to civil engineering students. 2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. GABRYS.

Prerequisite, Mathematics 5 or 7.

28. (Summer) PROPERTY AND TOPOGRAPHIC SURVEYING.—This course consists of a transit and tape property survey in which reference to Registry of Deeds records is required, and topographic survey of a selected area using the plane table. Certain advanced topics such as triangulation and conformal coordinate systems are discussed as they relate to the topographic survey.

3 44-hour weeks.

Credit, 3.
Mr. HENDRICKSON.

Prerequisite, Civil Engineering 25 or 27.

30. (Summer) ROUTE SURVEYING PRACTICE.—This practice course consists of a preliminary survey for a short highway location and of the preparation of maps and profile from the data recorded on the survey. The maps are to be used in C.E. 55 in choosing the final location of the route and in estimating earthwork quantities and cost.

3 44-hour weeks.

Credit, 3.
Mr. OSGOOD.

Prerequisite, Civil Engineering 25 or 27.

34. (II) APPLIED MECHANICS (STATICS).—The following topics are considered: equilibrium of forces, friction, first and second moments, center of gravity. Algebraic and graphical methods are covered.

3 class hours.

Credit, 3.
Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Physics 25; Mathematics 31.

51. (I) STRENGTH OF MATERIALS.—The following topics are considered: simple stresses and strains; combined stresses; torsion; shear and bending moments in beams; stresses and deflections of beams; columns. 4 class hours.

Credit, 4.
Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

52. (I) and (II) APPLIED MECHANICS (KINETICS).—The following topics are considered: kinematics, motion of particles, motion of rigid bodies, work and energy, power, impulse and momentum.

3 class hours.

Credit, 3.
Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

53. (I) STRENGTH OF MATERIALS.—A shortened version of C.E. 51 for electrical and mechanical engineers in the industrial option.

3 class hours.

Credit, 3.
Mr. WHITE, Mr. COFFEY, Mr. MARCUS.

Prerequisites, Civil Engineering 34; Mathematics 32.

55. (I) HIGHWAY ENGINEERING.—The design features of highway construction and relative merits of various types of highway surfaces are discussed in class. Plans, profiles, cross sections, and specifications for a short section of highway are prepared.
2 class hours; 1 3-hour laboratory period.

Credit, 3
Mr. GABRYS.

61. (I) and (II) TESTING OF MATERIALS.—A study of laboratory methods for determining the physical properties of engineering materials and their behavior under load.
1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. WHITE, Mr. COFFEY.

Prerequisite, Civil Engineering 51 or 53.

70. (II) THEORY OF STRUCTURES.—This course treats with the analysis of statically determinate structures of wood and steel, with reference to particular structures, such as industrial and office buildings, highway and railway bridges. The use of influence lines in the study of movable loads is included.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 51.

71. (I) STRUCTURAL DESIGN.—This course is an application of the theory of structures to engineering practice through the preparation of designs and drawings for structural frames, girders and trusses in steel and wood that together make up a complete building frame or bridge. Emphasis is placed upon the design of structural members and joints.
2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 70.

72. (II) ADVANCED STRUCTURAL THEORY.—The analysis of space frames and methods of finding deflections of trusses and beams are studied. Several methods of analysis of statically indeterminate structures are introduced. Application of the theories considered is made in the solution of practical problems during the laboratory periods.
2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. OSGOOD.

Prerequisite, Civil Engineering 70.

73. (I) CONCRETE.—This course deals with the general methods of analyzing plain and reinforced concrete structures. Application is made to the design of slabs, beams, girders, columns, walls and foundations for buildings, retaining walls and bridges. Drawings are prepared for a reinforced concrete building.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.
Mr. OSGOOD, Mr. GABRYS.

Prerequisite, Civil Engineering 51.

75. (I) FLUID MECHANICS.—This course is an abridgment of Civil Engineering 76.
3 class hours.

Credit, 3.
Mr. MARSTON, Mr. FENG.

Prerequisite, Civil Engineering 52.

76. (I) and (II) FLUID MECHANICS.—The following topics are considered: properties of fluids, gas laws, viscosity, static pressure, gages, buoyant forces, dynamics of fluids, Bernoulli's theorem, flow in pipes, orifices, nozzles, weirs, and open channels. Hydraulic similitude and dimensional analysis are discussed.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. MARSTON, Mr. FENG.

Prerequisite, Civil Engineering 52.

77. (I) SANITARY ENGINEERING I.—This course considers the engineering aspects of public water supply systems and includes the following topics: quantity of water required; hydrology; collection systems; distribution systems; pumping machinery; purification work. The laboratory period is used for inspection trips and the treatment of special problems.

3 class hours.

Credit, 3.

Mr. FENG.

Prerequisite, Civil Engineering 76 or 75 concurrently.

78. (II) SANITARY ENGINEERING II (SEWAGE).—This course considers the engineering aspects of the design, construction, and maintenance of sewerage systems and includes the following topics: hydraulics of sewers, sanitary and storm sewers, sewage treatment, plant design and operation.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Prerequisite, Civil Engineering 77.

Mr. FENG.

79. (I) PRINCIPLES OF SANITARY ENGINEERING.—This course is designed to fill the needs of students in the Department of Public Health. It covers phases of Civil Engineering 77 and 78 with consideration of the non-engineering background of the student. Admission by permission of the instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. FENG.

80. (II) SOIL MECHANICS.—This course is a study of the mechanical classification of soil based upon field and laboratory work and the validity of these classifications as a means of predicting soil behavior. The student is guided through case studies in embankment stability, seepage and consolidation.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Geology 50.

81. (I) FOUNDATIONS.—A survey of modern theories and practice in transferring structural loads to earth masses. Pile foundations, spread footings, caissons, and buoyant systems are discussed.

2 class hours, 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 80.

84. (II) TRANSPORTATION ENGINEERING.—This course treats the planning and design of freight and passenger terminals. Case histories are studied to show the peculiar problems of each of the four main kinds of transport; rail, highway, water, and air.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

MR. HENDRICKSON.

Prerequisite, Civil Engineering 55.

86. (II) SANITARY ENGINEERING DESIGN.—This is a laboratory course devoted to the design of sanitary engineering facilities, water supply and treatment, sewerage and sewage treatment.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

MR. FENG.

Prerequisites, Civil Engineering 77 and 78, or concurrently.

88. (II) ADVANCED STRESS ANALYSIS.—This course is concerned with the determination of stresses and strains in structural and machine elements.

3 class hours.

Credit, 3.

MR. WHITE.

Prerequisite, Civil Engineering 51.

90. (II) CONTRACTS, SPECIFICATIONS AND ESTIMATING.—A study of the essentials of contracts as applied to business procedures in the construction field, the purposes and make-up of specifications, and the processes of estimating through quantity, surveys and unit cost applications.

3 class hours.

Credit, 3.

MR. MARKUSON.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in civil engineering. Current engineering projects are described by student reports. The professional aspect of the civil engineer's work is stressed.

1 class hour.

Credit, 1.

THE DEPARTMENT.

94. (II) ADVANCED SURVEYING.—The following topics are included: elements of astronomy, precise methods of surveying, adjustment of observations and the elements of photogrammetry.

2 class hours. 1 3-hour laboratory period.

Credit, 3.

MR. HENDRICKSON.

Prerequisites, Civil Engineering 25, 28.

96. (II) HYDRAULIC ENGINEERING.—The analysis and design of hydraulic structures such as storage reservoirs, spillways, dams, levees, and shore protection and channel works are considered.

2 class hours. 1 3-hour laboratory period.

Credit, 3.

MR. MARSTON.

Prerequisites, Civil Engineering 71, 73, 76.

ELECTRICAL ENGINEERING

Professor BROWN, Professor ROYS, Associate Professor WILSON,
Associate Professor LANGFORD, Assistant Professor MOHN,†
Assistant Professor SMITH, Assistant Professor CHANG,
Mr. SACHSE,† Mr. JATRAS,† Mr. LEVINE,*

40. (II) FUNDAMENTALS OF ELECTRICAL ENGINEERING.—This course is a study of direct-current circuits, magnetism and electromagnetism, magnetic fields in air and iron, induced and generated voltages, inductance, capacitance, electric fields, conduction in liquids, and basic electrical measurements. The laboratory is devoted largely to electrical measurements, including instrument calibration and standardization, electrical instruments, fluxmeters, permeameters, simple bridges and potentiometers, and stresses analysis of methods and accuracies.

3 class hours; 1 3-hour laboratory period.

Credit, 4
Mr. BROWN.

Prerequisites, Physics 26; Mathematics 31.

51. (I) ALTERNATING-CURRENT CIRCUITS.—This course is a study of alternating currents in power and communication circuits, and includes instantaneous voltage and current relationships, vector representation, resonance, phenomena, basic network theorems, coupled circuits, single phase and polyphase circuits, power and power measurements, non-sinusoidal waves.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisite, Electrical Engineering 40.

53. (I) DIRECT-CURRENT MACHINERY.—This course is a study of direct-current generators and motors with respect to their characteristics, design, operation, applications, and control.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisite, Electrical Engineering 40.

54. (II) ALTERNATING-CURRENT MACHINERY.—This course is a study of alternating-current generators, motors, transformers, and converters with respect to their design, operation, control and applications.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisites, Electrical Engineering 51, 53.

57. (I) ENGINEERING ANALYSIS.—This course is a study of differential equations as applied to electric systems, hyperbolic, Bessel, and Legendre functions, vector analysis and calculus with applications to electricity and magnetism, elliptic integrals, and solutions of field problems by conformal mapping.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Mathematics 32; Electrical Engineering 40.

† On leave of absence.

* On leave of absence for military service

61. (I) 62. (II) PRINCIPLES OF ELECTRICAL ENGINEERING.—This course is designed for mechanical, industrial, and agricultural engineering students, and is a study of d-c and a-c circuits, d-c and a-c machines, and basic electronics.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. CHANG.

Prerequisites, Physics 26; Mathematics 32.

63. (I) ELEMENTS OF ELECTRICAL ENGINEERING.—This course is for civil and chemical engineering students and is a brief study of d-c and a-c circuits and machines.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. SMITH.

Prerequisites, Physics 26; Mathematics 32.

65. (I) INDUSTRIAL APPLICATIONS.—This course is designed for mechanical and industrial engineering students and is a brief study of motor selection and control, protective devices, and electric and electronic applications in industry, including measurement and control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. SMITH.

Prerequisite, Electrical Engineering 62.

74. (II) ELECTRONICS.—This course includes the study of electron motion in electric and magnetic fields, electron tubes and their characteristics, rectifiers, and Class A amplifiers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisite, Electrical Engineering 51.

75. (I) APPLIED ELECTRONICS.—This is a continuation of Course 74 and includes a study of electron tubes and associated apparatus in amplifiers, oscillators, amplitude and frequency modulation, detection, multi-vibrators, and vacuum tube instruments.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisite, Electrical Engineering 74.

77. (I) ELECTRICAL NETWORK ANALYSIS.—This course is a review of fundamental circuit principles and theorems, Fourier Series and Integral and their applications to distorted waves and pulses, long lines and filters under steady state a-c conditions and traveling waves in transmission systems.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisite, Electrical Engineering 51.

78. (II) TRANSIENT ANALYSIS.—This course is a study of the transient behavior of electrical, mechanical and thermal systems, and includes the formulation of the ordinary and partial differential equations

of dynamic systems and their solution by the classical and Heaviside methods and by Fourier and Laplace transforms.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 51, 57.

79. (I) ELECTRICAL COMMUNICATIONS.—This course is a study of the fundamentals of communication circuits, including circuit elements, basic network theorems, impedance transformations, equalizers, and bridge circuits.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisite, Electrical Engineering 51.

80. (II) ELECTRICAL COMMUNICATIONS.—This is a continuation of Course 75 and includes a study of vacuum tube circuits used in communications, distortion, noise, class B and C power amplifiers, modulation and demodulation practice, oscillator design, transmitters and receivers, antennas and radiation, and electromechanical transducers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. LANGFORD.

Prerequisites, Electrical Engineering 75, 79.

81. (I) ADVANCED ELECTRICAL MACHINERY.—This is a continuation of Course 54 and is a more advanced study of machines, including the general methods of machine analysis through the use of matrices, symmetrical components, equivalent circuits, and circle diagrams. Emphasis is placed on single-phase and variable-speed a-c motors, converters and inverters, selsyns and amplidynes, and multiwinding transformers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisite, Electrical Engineering 54.

82. (II) POWER APPLICATIONS IN INDUSTRY.—This course is a study of industrial applications of electrical machines, and includes power supplies to industrial plants, load requirements, types of drives, mechanical requirements of variable speed drives, torque relations in d-c and a-c motors, motor applications and control, and selsyn systems.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisite, Electrical Engineering 81.

84. (II) INDUSTRIAL ELECTRONICS.—This course is a study of special characteristics of the electron tubes of industry, the theory, design and operation of commercial types of circuits utilizing these tubes, including stroboscope, grid-controlled and polyphase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, and others.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. ROYS.

Prerequisite, Electrical Engineering 74.

86. (II) POWER SYSTEM NETWORKS.—This course is a study of power system networks including power transfer diagrams, voltage studies, system stability criteria, short-circuit calculations, and protective methods.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. WILSON.

Prerequisites, Electrical Engineering 77, 81.

88. (II) COMMUNICATION NETWORKS.—This is a continuation of Course 77, consisting of Foster's Reactance Theorem, the matrices of transducers and the principles of network synthesis. Applications include the analysis and design of filters, equalizers and other frequency responsive networks under both steady state and transient conditions.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 77, 79.

90. (II) ILLUMINATION.—This course is an introduction to illumination engineering and includes a study of light sources, units, measurements, vision, and lighting calculation and design.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisites, Physics 26; Mathematics 32.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in electrical engineering. Current engineering developments are discussed through student reports. The professional aspects of the electrical engineer's work is stressed. Instruction is given in the preparation of engineering papers for publication and in their presentation before technical audiences.

1 class hour.

Credit, 1.
Mr. BROWN.

94. (II) ULTRA-HIGH-FREQUENCY TECHNIQUES.—This course is a study of u.h.f. oscillators, amplifiers, transmitters, receivers, transmission systems, antennas, multi-vibrators, trigger and gate circuits, electronic switches, and controls.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisites, Electrical Engineering 75, 79.

96. (I) ELECTROMAGNETIC ENGINEERING.—This course is a study of the fundamentals of electromagnetic radiation, including Ampere's and Faraday's laws, Gauss's theorem, retarded potential and Hertz' vector, Maxwell's equations, and the Poynting vector. These are applied to wave propagation, reflection and refraction, lines, wave guides and cavity resonators, antennas, and ionosphere reflections.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 57, 77.

MECHANICAL ENGINEERING

Professor BATES, Professor SWENSON, Professor WEAVER, Associate
 Professor KEYSER, Assistant Professor DITTFACH, Assistant
 Professor LONGSTAFF, Assistant Professor EMERSON,†
 Assistant Professor LAKE, Assistant Professor
 ATHERTON, Mr. SOBALA.

1. (I) ENGINEERING DRAWING I.—The purpose of the course is to develop skill in the use of drafting equipment with a working knowledge of orthographic projections, lettering, auxiliary views, sectional views, tracings and pictorial representation of machine parts.

2 3-hour laboratory periods.

Credit, 2.

Mr. SWENSON, Mr. LAKE, Mr. GROW.

2. (II) ENGINEERING DRAWING II.—This course is designed to develop further skill in the use of drafting equipment and give practice in the making of working drawings through the study of dimensioning, fastenings, conventional representations, detail and assembly drawings, and reading of working drawings. Graphs, and intersection and development problems will also be studied.

2 3-hour laboratory periods.

Credit, 2.

Mr. SWENSON, Mr. LAKE, Mr. GROW.

Prerequisite, Mechanical Engineering 1.

3. (I) DESCRIPTIVE GEOMETRY.—The course encompasses a study of the graphical methods applicable to engineering problems. Its content consists of the principles of orthographic projections, problems relating to lines and planes, graphic computations, polyhedrons, curved surfaces, warped surfaces and practical applications.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. LAKE, Mr. SOBALA, Mr. GROW.

Prerequisite, Mechanical Engineering 2.

23. (I) SHOP.—The course is designed primarily for engineers other than mechanical. Approximately half the semester is spent in woodworking, pattern making, and welding; in the other half the student gains experience in the machine shop, where he becomes familiar with the various machine and hand tools used in metal working.

2 4-hour laboratory periods.

Credit, 3.

Mr. LAKE, Mr. PUSHEE, Mr. PATTERSON.

27. (Summer) SHOP.—In the first part of the course woodworking and pattern making experience is gained on machines and with hand tools at the bench. The course then proceeds to the various methods of welding.

2 4-hour laboratory periods.

Credit, 3.

Mr. PUSHEE, Mr. PATTERSON.

28. (Summer) MACHINE SHOP.—A knowledge of metalworking equipment is obtained by using the fundamental machine tools such as the lathe, planer, shaper, milling machine and drill press. A reasonable

† On leave of absence.

amount of bench work is included. Classroom work is devoted to the theory of machine tool operation, fits, tolerances and measurement.

2 4-hour laboratory periods.

Credit, 3.
Mr. LAKE.

59. (I) and (II) MATERIALS OF CONSTRUCTION.—Properties of engineering materials; failure by (a) exceeding the elastic limit, (b) creep, (c) fatigue, and (d) corrosion. The crystalline nature of metals. Properties and uses of the structural metals, wood, stone, clay products, cementing materials, concrete, plastics, protective coatings, and water.

2 class hours.

Credit, 2.
Mr. KEYSER.

Prerequisites, Chemistry 1; Physics 26.

63. (I) ENGINEERING THERMODYNAMICS I.—This course is a treatment of the application of the laws of heat to various energy-transforming devices. Topics include ideal and actual cycles of steam, internal combustion engines, and air compressors together with problems pertaining to these machines, energy transformations in fluid flow, variable specific heats and mixtures of gases.

4 class hours.

Credit, 4.
THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 30 or 32.

64. (II) ENGINEERING THERMODYNAMICS II.—A continuation of the work of Course 63. Study will be made of liquids and vapors, thermodynamic cycles, energy transformations and the transfer of heat, together with engineering problems pertaining to these devices.

4 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63.

65. (I) HEAT ENGINEERING I.—This course is a survey of the field of applied energy and is designed for engineering students outside of the mechanical engineering field. The application of the laws of heat to energy transforming devices is studied, but not as extensively as in Courses 63 and 64. A study will be made of gases, vapors, fuels, combustion, heat transfer, measurement of power, and internal combustion engines.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 6.

66. (II) HEAT ENGINEERING II.—A continuation of the work of Course 65. Air compressors, fans, refrigeration, and air conditioning, turbines, jet propulsion and power plants will be studied.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisite, Mechanical Engineering 65.

67. (I) MECHANICAL INSTRUMENTATION LABORATORY.—The calibration and application of instruments used in the testing of mechanical engineering apparatus.

1 3-hour laboratory period.

Credit, 1.

Mr. BATES, Mr. DITTFACH.

Prerequisite, Mechanical Engineering 63 concurrently.

68. (II) KINEMATICS.—Principles of mechanism, including velocity and acceleration diagrams, instant centers, gear teeth and gear trains, cams, and various speed transmissions.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES, Mr. SOBALA.

Prerequisites, Mechanical Engineering 1; Civil Engineering 52.

72. (II) FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are then applied to the study of the iron-iron carbide diagram, the S-curve, heat treatment of steel and the properties and uses of the other principal engineering metals. Laboratory work stresses metallographic and radiographic technique.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER.

Prerequisite, Mechanical Engineering 59 or Chemistry 66.

75. (I) STEAM POWER PLANTS.—This course is a study of the steam power plant, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, and engineering problems involved in design and operation.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SWENSON.

Prerequisite, Mechanical Engineering 64.

76. (II) REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SWENSON, Mr. ATHERTON.

Prerequisite, Mechanical Engineering 64.

77. (I) INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included.

3 class hours.

Credit, 3.

Mr. DITTFACH.

Prerequisite, Mechanical Engineering 64.

79. (I) MECHANICAL ENGINEERING LABORATORY I.—Tests of fuels and lubricants. Performance tests of steam engines and turbines, gasoline

and Diesel engines, fans, hydraulic apparatus, refrigeration systems and other typical engineering equipment. Emphasis on laboratory procedure and orderly presentation of results.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisites, Civil Engineering 76 or 75 concurrently; Mechanical Engineering 64 or 66; Mechanical Engineering 67 for Mechanical Engineering majors.

80. (II) MECHANICAL ENGINEERING LABORATORY II.—This course continues the work of the first semester in more advanced phases.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 79.

82. (II) FLUID MACHINERY.—Application of the principles of fluid mechanics to the theory of impulse and reaction water wheels, centrifugal pumps and compressors, and axialflow blowers. Consideration is also given to the design of high pressure reciprocating and rotary pumps, hydraulic transmissions, sequence valves, etc., and their use in hydraulic circuits.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Civil Engineering 76.

83. (I) MACHINE DESIGN.—Principles involved in the design of various machine parts including fastenings, shafts, belts, bearings, gears, and pressure vessels.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

MR. BATES.

Prerequisites, Civil Engineering 51 or 53; Mechanical Engineering 68.

85. (I) DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers.

3 class hours.

Credit, 3.

MR. ATHERTON.

Prerequisites, Civil Engineering 52; Mechanical Engineering 68.

86. (II) ADVANCED MACHINE DESIGN.—A continuation of Course 83. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

MR. BATES.

Prerequisite, Mechanical Engineering 83.

88. (II) STEADY FLOW MACHINERY.—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus.

3 class hours.

Credit, 3.

MR. SWENSON.

Prerequisites, Mechanical Engineering 64 or 66; Civil Engineering 76.

90. (II) **ADVANCED METALLURGY.**—Mechanical metallurgy covering the behavior of metals in the plastic state; the shaping of metals by mechanical means such as drawing, rolling, spinning, etc.; the primary methods of metal fabrication such as casting, welding, powder metallurgy, electroforming; metallurgical applications of radiography.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. KEYSER.

Prerequisite, Mechanical Engineering 72.

91. (I) **PROFESSIONAL SEMINAR.**—For senior and graduate students only. Presentation of papers on various important subjects in the field of mechanical engineering, with principal emphasis on recent developments.

Credit, 1.
THE DEPARTMENT.

Industrial Engineering

25. (I) **MANUFACTURING PROCESSES.**—The methods of producing and fabricating the basic engineering materials: metals, cementing materials, ceramics, plastics, rubber, and lumber. Production methods (excluding machining) of metal parts and their assembly in a typical mass production industry is discussed. Laboratory periods involve inspection trips and movies.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. KEYSER.

26. (Summer) **TOOL ENGINEERING.**—This course includes the determination of the manufacturing operations necessary to produce a finished product. This is followed by consideration of the principles embodied in the design of jigs, fixtures, dies, and gauges necessary to perform each operation. The economics of tooling as influenced by intermittent or continuous type manufacturing and the effect of volume are also included.

3 44-hour weeks.

Credit, 3.
Mr. LAKE.

51. (I) **INDUSTRIAL MANAGEMENT.**—A course designed to acquaint the student with the principles of industrial engineering and their application to the solution of the problems of industrial plant operation.

3 class hours.

Credit, 3.
Mr. WEAVER.

75. (I) **JOB EVALUATION.**—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies.

3 class hours.

Credit, 2.
Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

76. (I) **TIME STUDY.**—A study of the principles involved in the establishment of production standards and their application in the man-

agement functions of cost accounting, estimating, production control, incentives, budgetary control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. WEAVER.

Prerequisites, Industrial Engineering 75.

77. (I) PRODUCTION CONTROL.—A study of the principles used to regulate production activities in keeping with the manufacturing plan.

3 class hours.

Credit, 3.
Mr. EMERSON.

Prerequisite, Industrial Engineering 51.

78. (II) FACTORY PLANNING AND LAYOUT.—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. SOBALA.

Prerequisites, Mechanical Engineering 2; Industrial Engineering 51.

80. (II) PLANT BUDGETARY CONTROL.—A study of the principles used to pre-determine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant.

3 class hours.

Credit, 3.
Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

82. (II) WORK SIMPLIFICATION.—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. WEAVER.

Prerequisite, Mechanical Engineering 68.

86. (II) INDUSTRIAL MANAGEMENT.—Designed for students other than industrial engineers. A broad course dealing with the many problems encountered in a modern industry. Topics include types of organization, management, plant location, arrangement of equipment, product design, methods of production control, costs, wage payment systems and personnel relations.

3 class hours.

Credit, 3.
Mr. EMERSON.

88. (II) MOTION AND TIME STUDY.—This course covers the combined fields of motion study and time study for junior and senior students outside the industrial engineering field.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. SOBALA.

92. (I) PROFESSIONAL SEMINAR.—For seniors and graduate students.

Credit, 1.

ENGLISH

Professor RAND, Professor GOLDBERG, Professor HELMING, Professor TROY, Associate Professor O'DONNELL, Assistant Professor HERRIGAN, Assistant Professor VARLEY, Assistant Professor LANE, Assistant Professor ALLEN, Assistant Professor WILLIAMS, Assistant Professor KOEHLER, Mrs. WRIGHT, Mr. KAPLAN,† Mrs. HOGAN, Mr. BARRON, Mr. MITCHELL, Mr. CLARK, Mr. MADEIRA, Mr. MACLAINE, Mr. TUCKER.

Composition

1. (I) 2. (II) ENGLISH COMPOSITION.—Intended to teach straight thinking, sound structure, clear and correct expression. Scheduled hours include Speech 3. (I) 4. (II).
2 class hours.

Credit, 2.

THE DEPARTMENT.

81. (I) (II) CREATIVE WRITING.—A course in critical and imaginative composition based upon the examples of standard authors and the experience of the student. It provides an opportunity for work in description, narrative, verse and drama as well as in exposition.
3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, a mark of A or B in English 2 (U. of M.) or permission of instructor.

83. (I) (II) TECHNICAL WRITING.—For majors in engineering. A course in factual and inductive exposition with special emphasis upon process reports and theses.
2 class hours.

Credit, 2.

Mr. MITCHELL.

Prerequisites, English 1, 2.

84. (II) TECHNICAL WRITING.—For students not majoring in engineering. A course in factual and inductive exposition with special emphasis upon library research and the preparation of reports, essays, and theses.
3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, English 1, 2.

Literature

25. (I) 26. (II) HUMANE LETTERS.—A general reading course based upon a chronological selection of masterpieces: classical, continental, and English.
3 class hours.

Credit, 3.

THE DEPARTMENT.

50. (II) CHAUCER.—A study of Chaucer's development and pre-eminence as a creative artist and an attempt to appreciate his humanism.
3 class hours.

Credit, 3.

Mr. HELMING.

51. (I) THE RENAISSANCE IN ENGLAND.—A study of various aspects of the Renaissance as revealed in such writers as Spenser, Bacon, Sir

† On leave of absence.

Thomas Browne, Burton, and Hobbes. Special emphasis is given to Spenser's *Faerie Queene*.

3 class hours.

Credit, 3.
Mr. TROY.

53. (I) LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND (1952-53).—A study of lyrical poets such as Sidney, Campion, Jonson, Herrick, Lovelace, Suckling, Carew, Donne, Herbert, Vaughan, Crashaw, Traherne and Marvell. Special emphasis is given to the "Metaphysical" tradition.

Given in alternate years.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

54. (II) MILTON.—The development of the mind and art of Milton as a Renaissance writer. Emphasis is placed upon *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

3 class hours.

Credit, 3.
Mr. GOLDBERG, Mr. HELMING.

55. (I) SHAKESPEARE.—This course is based upon the reading of about twenty-five of Shakespeare's plays, and attempts both to indicate the evolution of the dramatist and to emphasize the various phases of his art.

3 class hours.

Credit, 3.
Mr. RAND.

67. (I) AMERICAN PROSE.—A course in the chief American prose writers of the nineteenth and twentieth centuries. Among the authors studied are Emerson, Thoreau, Hawthorne, Melville, Mark Twain, Henry Adams, and Henry James.

3 class hours.

Credit, 3.
Mr. O'DONNELL.

57. (I) ENGLISH LITERATURE OF THE RESTORATION.—A study of the social problems and literary values of the Restoration period as they reflect in prose, verse, and drama. Emphasis will be placed on the Theater, both tragic and comic, with particular attention to the role of wit, "humour", and satire in the Restoration Comedy of Manners.

3 class hours.

Credit, 3.
Mr. KOEHLER.

58. (II) ELIZABETHAN DRAMATISTS.—A study of English drama from the death of Elizabeth to the closing of the theaters. Special consideration will be given to the plays of Jonson, Beaumont, Fletcher, Webster, Middleton, Massinger, and Shirley.

3 class hours.

Credit, 3.
Mr. O'DONNELL.

59. (I) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A study of the literature of the Augustan Age, with special emphasis on the writing of Swift and Pope.

3 class hours.

Credit, 3.
Mr. TROY.

60. (II) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A continuation of English 59, but may be elected independently. A study of the literature of the later Eighteenth Century with special emphasis on the Johnson Circle.

3 class hours.

Credit, 3.
Mr. TROY.

61. (I) ROMANTIC POETRY (1952-53).—A study of the Lake Poets (primarily Wordsworth and Coleridge) and their precursors. Given in alternate years.

3 class hours.

Credit, 3.
Mr. RAND.

62. (II) ROMANTIC POETRY (1952-53).—A continuation of English 61 but may be elected independently. A study of Byron, Shelley and Keats. Given in alternate years.

3 class hours.

Credit, 3.
MISS HORRIGAN.

63. (I) AMERICAN POETRY.—A study of American poetry from Colonial times to 1900, with special emphasis upon the work of Freneau, Bryant, Emerson, Longfellow, Whittier, Poe, Whitman, and Emily Dickinson.

3 class hours.

Credit, 3.
Mr. O'DONNELL, Mr. ———.

69. (I) VICTORIAN POETRY (1951-52).—A study of Tennyson and Browning. Given in alternate years.

3 class hours.

Credit, 3.
Mr. RAND.

65. (I) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A study of the chief Romantic prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Coleridge, Lamb, Hazlitt, DeQuincey, Carlyle, and Ruskin.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

66. (II) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A continuation of English 65, but may be elected independently. A study of the chief Victorian prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Macaulay, Newman, Arnold, Huxley, Pater, and Stevenson.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

68. (II) MODERN DRAMA.—This course traces the development of English and American drama from the time of Ibsen to the present day. Its purpose is to impart an intelligent and enthusiastic interest in the theatre of the twentieth century.

3 class hours.

Credit, 3.
Mr. RAND, Mr. WILLIAMS.

71. (I) BIOGRAPHY.—The history of the biography as a literary type; discussion of leading biographers from Boswell to Maurois, with special emphasis upon the development of the modern biographical method.

3 class hours.

Credit, 3.

Mr. HELMING.

72. (II) THE BIBLE AS LITERATURE.—A study of the King James version of the Bible, with emphasis upon the Hebrew as discernible in translation, the poetic qualities characteristic of Tudor England, and the varied influence of the Bible upon subsequent English poetry.

Mr. RAND.

73. (I) THE NOVEL FROM DEFOE THROUGH THE VICTORIANS.—The development of the novel: the reading and discussion of eight or nine great English novels of the eighteenth and nineteenth centuries.

3 class hours.

Credit, 3.

Mr. ALLEN, Mr. HELMING.

74. (II) GREEK CLASSICS IN TRANSLATION.—Readings and discussion of the epics of Homer, representative dramas of Aeschylus, Sophocles, Euripides, and Aristophanes, the "Socratic" dialogues of Plato, and Thucydides' history of the Peloponnesian War. Intended to acquaint students with the famous myths and stories of classical antiquity, and the literary forms and ideas which have contributed most to subsequent literatures.

3 class hours.

Credit, 3.

Mr. HELMING, Mr. TROY.

76. (II) MODERN POETRY.—This course attempts to trace the spirit of twentieth century poetry from such authors as Hardy, Whitman, and Emily Dickinson to those of the present day.

3 class hours.

Credit, 3.

Mr. RAND, Miss HARRIGAN.

77. (I) THE MODERN NOVEL.—An analytical presentation of eleven novels written between 1890 and 1930, in which the expanding form and the extension of critical themes will be stressed.

3 class hours.

Credit, 3.

Mr. VARLEY.

79. (I) LITERARY CRITICISM (1951-52).—A study of major critical attitudes and principles, in relation to philosophic background and to practice. Emphasis is placed upon important critics and theorists from Plato and Aristotle through those of the eighteenth century. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

80. (II) LITERARY CRITICISM (1951-52).—A continuation of English 79, but may be elected independently. Emphasis is placed upon important critics and theorists of the nineteenth and twentieth centuries. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

ENTOMOLOGY

Professor ALEXANDER, Professor SWEETMAN, Assistant Professor HANSON,
Assistant Professor SHAW, Dr. SMITH, Mr. FIELD,* Mr. FARR.

26. (II) GENERAL AND FIELD ENTOMOLOGY.—The lectures are devoted to a brief survey of the entire field of entomology; structure and metamorphosis; the more important methods and materials for control of injurious species; a survey of the more conspicuous and important insects with particular attention to the fauna of New England. A laboratory period will be devoted to the preparation and formation of a collection of insects. Until about April 10th, this work will be done indoors and will consist of lectures and practical work preparatory to the field work after that date. Collections made by the students are studied in later courses.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 M. F.; 1:00-2:50 M. Tu. W. Th. F.

Mr. ALEXANDER, Miss SMITH.

51. (I) PESTS OF SPECIAL CROPS.—For students not specializing in entomology who desire a more complete knowledge of the insects connected with their major lines of work. Work in the laboratory consists of identification, life-history studies and control measures of important insect pests. Work of this nature is available on pests of field crops, market-garden crops, fruits, flowers, shade trees and shrubs, forest trees, household articles, domestic animals, and man.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 M.; 1:00-2:50 Tu.; 2:00-3:50 Th. Mr. SHAW.
Prerequisite, Entomology 26.

53. (I) APPLIED ENTOMOLOGY.—Studies on the more important insect pests, their life-histories, damage, identification, and methods of control. Special attention is devoted to the use of entomological literature, methods of preparing scientific papers, and the general principles of insect control.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 W.; 3:00-4:50 M. F. Mr. FIELD.
Prerequisite, Entomology 26.

55. (I) 56. (II) CLASSIFICATION OF INSECTS.—Laboratory work on the identification of the major orders of insects. In Course 56, the immature stages of insects, with particular stress on their structure and recognition.

3 2-hour laboratory periods. Credit, 3.
8:00-9:50 Tu. Th. S. Mr. ALEXANDER, Miss SMITH.
Prerequisites, Entomology 26; Entomology 57, previously or concurrently.

57. (I) INSECT MORPHOLOGY.—The lectures treat of the internal and external anatomy of insects, particular stress being placed on those

* On leave of absence for military service

structures needed in classification, for use in the parallel Course 55. In the laboratory, the internal and external anatomy of the more important groups is studied, with emphasis on those characters most used in the determination of insects.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.

10:00-10:50 F.; 1:00-2:50 M. Tu. F.

Mr. HANSON.

Prerequisite, Entomology 26.

60. (II) STRUCTURAL PEST CONTROL.—For students specializing in entomology, especially those desiring to enter the structural pest field, and others interested in gaining knowledge of methods of combating insect and rodent pests. The emphasis will be placed on the control of those pests attacking buildings and other structures, foods, fabrics, and other stored products in private homes or other establishments. The life history, feeding habits, methods of reproduction, and dispersal of the various species will be stressed in so far as these influence control measures.

2 class hours.

Credit, 2.

11:00-11:50 M. F.

Mr. SWEETMAN.

Prerequisite, Zoology 1; Entomology 26 desirable.

72. (II) FOREST AND SHADE TREE INSECTS.—The lecture work deals with the principles and methods of controlling insects which attack shade trees, forests and forest products. The laboratory periods are devoted to a study of the more important species, their identification, biology, and specific control measures.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 M. F.

Mr. HANSON, Mr. FIELD.

Prerequisite, Entomology 26; 53, 55, 56, and 57 desirable.

74. (II) MEDICAL ENTOMOLOGY.—Relationships of insects and their allies to the transmission of diseases of man and animals. Especial attention is given to such transmission under war conditions, and to camp sanitation and similar topics.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 W.; 3:00-4:50 Tu. Th.

Mr. SHAW.

Prerequisite, Entomology 26.

79. (I) ANIMAL ECOLOGY.—Designed for students specializing in entomology, zoology, and related fields. The course deals with the relation of animals to their environment, covering the physical factors as temperature, moisture, light, etc., and biotic factors as neighbors, competitors, predators, etc. Both terrestrial and aquatic communities are studied. The student is shown not only that animals do things, but why they make definite responses to the environmental factors. Actual measurements of the environmental factors and responses of the animals in the field and laboratory are included.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 M.

Mr. SWEETMAN

Prerequisite, Entomology 26 or Zoology 1 or equivalent.

80. (II) INSECT CONTROL.—The scientific basis of insect control is considered from the chemical, biological, ecological, mechanical, and legislative approaches. Special emphasis is placed on the composition, manufacture, preparation, and reaction of insecticides, and the use of resistant hosts, micro-organisms and the larger parasites and predators that might be used in the control of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 M.; 3:00-4:50 M. F.

Mr. SWEETMAN.

Prerequisites, Entomology 53, 55, and 57; 79 and 81 desirable.

81. (I) PHYSIOLOGICAL ENTOMOLOGY.—A detailed consideration is given to the organ systems, showing the functions such as nutrition, respiration, and growth, and the relationship of physiology to behavior. A portion of the laboratory time will be devoted to assigned individual problems dealing with any phase of insect biology or control and conducted on a research basis.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 Th.; 3:00-4:50 W. F.

Mr. SWEETMAN.

Prerequisite, Entomology 26; 55, 56, and 57 desirable.

87. (I) 88. (II) SPECIAL PROBLEMS IN ENTOMOLOGY.—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification. Intended primarily to introduce qualified students to research methods in some branch of entomology. Excess departmental credits are necessary for election.

Hours by arrangement.

Credit, 1, 2, or 3.

THE DEPARTMENT.

Prerequisites, Entomology 26, 53, 55, 57, and should be preceded or accompanied by any other courses in the restricted field of the problem.

89. (I) ENTOMOLOGICAL TECHNIQUES.—Theory and practice in the preservation, preparation, and mounting of insects for study and display. Excess departmental credits are necessary for election.

2 2-hour laboratory periods.

Credit, 2.

Hours by arrangement.

Miss SMITH.

Prerequisites, Entomology 26 and permission of instructor.

90. (II) EVOLUTION.—In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind; the evolution of human intelligence, and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, variation, and similar topics, with particular reference to their application to human welfare.

2 class hours.

Credit, 2.

10:00-10:50 M. F.

Mr. HANSON.

Apiculture

66. (II) INTRODUCTORY BEEKEEPING.—The laboratory work consists of a study of beekeeping equipment and the methods of assembling this material; a study of pollen and honey plants; spring management. The lectures are intended to give the student a broad grasp of the entire field of beekeeping, considering such subjects as history; statistics of beekeeping in America; the races of bees; methods of management; bee-diseases; pollination; queen-rearing.

2 class hours; 1 2-hour laboratory period.
11:00-11:50 M. F.; 1:00-2:50 M.

Credit, 3.
Mr. SHAW.

85. (I) ADVANCED BEEKEEPING.—The laboratory work consists of fall management, care of the honey crop, preparation of colonies for wintering, bee-diseases, and some simple types of biometrical problems. The lectures consider, among other things, the physical and chemical characteristics of honey and wax; chemical tests to detect adulteration of honey; bee-diseases; and biometry.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. SHAW.

Prerequisite, Entomology 66.

BIOLOGICAL FIELD STUDIES

Professor VINAL.

51. (I) 52. (II) BIOLOGICAL FIELD STUDIES (1951-52).—Course 51 is devoted to field studies with fall flowers, trees in winter, wood specimens, evergreens and the making of terraria. Course 52 deals with topography, glaciers, minerals, birds, and spring flowers with special emphasis on methods, skills and techniques of leadership in nature education. These courses are required of students specializing in recreational leadership. Enrollment limited to twenty-five. Given in alternate years.

1 class hour; 2 2-hour field periods.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. VINAL.

61. (I) 62. (II) PUBLIC RELATIONS IN NATURE RECREATION.—For juniors and seniors specializing in recreational leadership; others may elect by special arrangement with the instructor. A course in public contacts designed to bring to the attention of the student the natural history background with which one must be familiar if he is to succeed in public work. Community facilities, population, land use, climate, housing, good rural life in relation to community planning and nature recreation, are some of the factors to be considered. Each student will be expected to make a survey of his home town.

3 class hours.
10:00-10:50 Tu. Th.

Credit, 3.
Mr. VINAL.

71. (I) 72. (II) ADVANCED BIOLOGICAL FIELD STUDIES (1952-53).

This course is devoted to field studies with cultivated plants, bog plants, the seabeach, salt water and fresh water aquaria, shell fish, amateur weather bureau, conservation, camping, education, the observation bee hive, gardening, school and community forests, animals in winter.

Community service is expected. Enrollment limited to twenty-five. Given in alternate years.

1 class hour; 2 2-hour field periods.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.

Mr. VINAL.

73. (I) 74. (II) SPECIAL PROBLEMS IN NATURAL SCIENCE.—For juniors and seniors specializing in recreational leadership. It is expected that the problem will relate to the immediate career which the student has in view.

3 class hours.

Hours by arrangement.

Credit, 3.

Mr. VINAL.

FINE ARTS

Associate Professor ALVIANI, Mr. CONTINO.

Art

27. MODELING.—A course in elementary modeling, of seeing, analyzing, and reproducing form in clay and modeling wax to develop sculptural technique.

6 laboratory hours.

Credit, 3.

Mr. McLINDON.

28. MODELING.—A continuation of Course 27 in advanced design and the making of plaster casts from original problems in small sculpture, such as plaques, masks, and medals or other such pieces.

6 laboratory hours.

Credit, 3.

Mr. McLINDON.

Prerequisite, Art 27.

31. (I) ELEMENTARY DESIGN.—For women. Elementary principles of design as applied to textiles, fabrics, interior decorations, etc.

3 2-hour laboratory periods.

Credit, 3.

Mr. MACIVER.

33. (I) FREEHAND DRAWING.—A non-professional course in elementary drawing and painting in various media in black and white. The work is more or less personal and is adapted to the individual capacities and backgrounds of each student as far as possible.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

34. (II) FREEHAND DRAWING.—This non-professional course is essentially one in which the use of color is stressed in various media, freehand drawing is emphasized and paintings in still-life and landscape subjects are produced.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

75. (I) ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts, leading toward the enjoyment of art and its application to every day life.

3 class hours.

Credit, 3.

Mr. OTTO.

77. (I) EARLY AND MEDIEVAL ART.—An appreciative survey of art and history from early times through the medieval period. Works in painting, sculpture, architecture, and the minor arts are examined in the light of their contributions to the history of civilization, and to the development of art forms.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. ———.

78. (II) RENAISSANCE AND MODERN ART.—This course is a continuation of Art 77, bringing the historical survey of art down to modern times. While it is advisable to take both courses, either may be elected independently.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. ———.

Music

As an addition to the courses listed below, the department can make arrangements with thoroughly well-qualified teachers to offer private instruction, without course credit, in vocal production, and instrumental playing.

25. (I) 26. (II) ELEMENTARY INSTRUMENTAL OR VOCAL ENSEMBLE.—Admission by permission of instructor. Not open for credit to freshmen, to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course is designed to improve the playing of instruments and/or the use of the singing voice, and to create further appreciation of music by the most direct of teaching methods—actual performance. Students electing this course should take both 25 and 26.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

27. (I) 28. (II) INTERMEDIATE INSTRUMENTAL OR VOCAL ENSEMBLE. Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. A continuation of Music 26, for the training of performers in small groups, such as string quartet, two piano, and/or mixed vocal octet, female trio, etc. Students electing this course should take both 27 and 28.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 26.

29. (I) 30. (II) ADVANCED INSTRUMENTAL OR VOCAL ENSEMBLE.—Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course presents to the student various techniques of solo performance, of program planning, and of teaching beginners in vocal or instrumental music. Those electing this course should take both 29 and 30.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 28.

51. (I) **DISCOVERING MUSIC.**—This elementary course is non-technical in nature and is designed primarily for those students who would like to acquire a general background and knowledge of this great art. With learning to listen its motive, the course deals with the elements of music, forms in music, musical compositions, and with selected composers. Excerpts from the works of great masters will be used as illustrations.

3 class hours.

10:00-10:50 or 11:00-11:50 M. W. F.

Credit, 3.

Mr. ALVIANI.

52. (II) **GREAT PERIODS OF MUSIC.**—This course attempts to transport the student into the spirit of each of several great periods of music—Renaissance, Baroque, Classic, Romantic, and Modern—so that he will feel their quality, understand their enthusiasms, their technical resources and limitations, and their habits of thought and style.

3 class hours.

1:00-1:50 or 2:00-2:50 Tu. W. Th.

Prerequisite, Music 51.

Credit, 3.

Mr. CONTINO.

55. (I) **ADMINISTRATION AND DIRECTION OF CHORAL ORGANIZATIONS.**—The aim of this course is to demonstrate the methods of developing school and community choral groups. Conducting techniques are taught and factors of good vocal performance are studied. The student will conduct choral groups during the term. Previous musical experience is desirable.

2 class hours.

4:00-4:50 W., one hour by arrangement.

Credit, 2.

Mr. ALVIANI.

56. (II) **ADMINISTRATION AND DIRECTION OF INSTRUMENTAL ORGANIZATIONS.**—The student is introduced to the different types of instrumental music, the problems of balancing instrumentation, and to the functioning of orchestral instruments. Conducting techniques will be practiced before instrumental groups of various sizes. Previous musical experience is desirable.

2 class hours.

4:00-4:50 W., one hour by arrangement.

Credit, 2.

Mr. CONTINO.

61. (I) **GREAT MASTERPIECES OF MUSIC.**—The course includes the history and analysis of selected compositions most frequently heard in the concert hall, on records, and on the radio. The selected works will be masterpieces composed during the last two hundred years by the best known composers.

3 class hours.

9:00-9:50 M. W.

Prerequisite, Music 51 or 52 or permission of instructor.

Credit, 3.

Mr. CONTINO.

62. (II) **MUSIC IN THE ELEMENTARY GRADES.**—The principles of musical development are studied with particular emphasis on presentation in the classroom. Although the course is designed primarily for those

preparing to teach in the elementary grades, others may elect it upon approval of the instructor.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. CONTINO.

75. (I) FUNDAMENTALS OF MUSIC.—This is a correlated study of theory, written and keyboard harmony, ear training, form and analysis. These fundamentals are applied to improve the student's musical appreciation. The course is non-technical in its approach and no previous musical experience is required.

3 class hours.

1:00-1:50 M.W.F.

Credit, 3.
Mr. ALVIANI, Mr. CONTINO.

76. (I) FUNDAMENTALS OF MUSIC.—A continuation of Music 75. More detailed musical examples are used and further study of the musical fundamentals is made. Primarily, the student will develop more mature consideration of the multifarious musical forms and techniques.

3 class hours.

11:00-11:50 Tu., 12:00-12:50 W. Th.

Credit, 3.
Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 75.

FLORICULTURE

Professor THAYER, Assistant Professor HUBBARD, Assistant Professor ROSS,
Mr. DUNHAM.

26. (II) GARDEN MATERIALS.—A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants, and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture, and uses of the various plants are considered as well as identification of materials.

2 class hours; 1 2-hour laboratory period.

11:00-11:50 M. F.; 3:00-4:50 M.

Credit, 3.
Mr. DUNHAM.

51. (I) GREENHOUSE MANAGEMENT.—This course is intended to familiarize students with the methods and principles involved in the management of greenhouses and greenhouse crops; history and development of the floricultural industry, preparation of soils, fertilizers, potting, watering, ventilation, control of insects and diseases, methods of plant propagation, forcing plants, soilless methods of plant culture. At some time during the semester the members of the class will be required to take a one-day trip to visit large commercial establishments at an approximate cost of five dollars.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 M. F.; 3:00-4:50 F.

Credit, 3.
Mr. THAYER, Mr. DUNHAM.

52. (II) FLORAL ARRANGEMENT.—A study of the principles involving the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangements, corsages, wedding bouquets, table decorations,

home, church, and other interior decorations. A study of color and color harmony as applied to such work. This course is limited to ten students, preference being given to students specializing in floriculture and landscape architecture.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. THAYER, Mr. ROSS.

8:00-8:50 Th.; 1:00-2:50 M. F.

54. (II) GREENHOUSE CONSTRUCTION AND HEATING.—The location, types, arrangement, construction, cost, equipment, heating, and ventilation of greenhouse structures; the drawing of plans and study of specifications. Special emphasis laid on heating problems.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 F.

Mr. THAYER, Mr. DUNHAM.

58. (II). AMATEUR FLORICULTURE.—This course is intended primarily for major students in the School of Home Economics and for other women students. Three phases of floriculture will be considered: (1) the arrangement and use of cut flowers for decorative purposes in the home and elsewhere, (2) house plants, methods of propagation, (3) garden flowers and their uses on the home grounds.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu.; 1:00-1:50 Th.; 1:00-2:50 W. or 2:-3:50 Th.

Mr. THAYER, Mr. ROSS.

75. (I) 76. (II) COMMERCIAL FLORICULTURE.—A detailed study of the cultural methods for the important commercial cut-flower crops and potted plants. The marketing of flowers and plants, including the management of wholesale markets and retail stores, a study of systems of record keeping, cost analysis, inventory methods, and other phases of this important part of the floricultural industry. Trips may be taken to nearby commercial establishments.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu., Th.; 1:00-2:50 Tu.

Mr. HUBBARD.

Prerequisite, Floriculture 51.

79. (I) CONSERVATORY PLANTS (1952-53).—Alternates with Course 81 for students specializing in floriculture. A study of the foliage and flowering plants used in conservatory work; methods of propagation; identification of materials.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

3:00-3:50 W.; 1:00-2:50 F.

Mr. THAYER, Mr. DUNHAM.

81. (I) HERBACEOUS GARDENS AND BORDERS.—Alternates with Course 79 for students specializing in floriculture; given annually for students specializing in landscape architecture. This course is a continuation of Course 26 with emphasis on the use of herbaceous materials in various types of planting of borders and gardens.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

1:00-1:50 Th.; 2:00-4:50 Th., one laboratory hour by arrangement.

Mr. HUBBARD.

Prerequisite, Floriculture 26.

82. (II) SEMINAR.—For seniors specializing in floriculture. Presentation and discussion of research work in floriculture and other related fields.

1 class hour; 4 laboratory hours.

Credit, 3.

THE DEPARTMENT.

FOOD TECHNOLOGY

Professor FELLERS, Associate Professor LEVINE, Assistant Professor KRANZ,
Dr. FITZPATRICK,* Dr. NEBESKY.

51. (I) INTRODUCTORY COURSE.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu., Th.; 1:00-2:50 W. or Th.

Mr. FELLERS.

52. (II) FOOD PRODUCTS AND ADJUNCTS.—This is a continuation of Course 51. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments, and the preservation of meats, poultry, and vegetables. The properties and uses of sugars, syrups, brines, enzymes, acids, salt, pectin, preservatives and antioxidants are considered. Experience is given in the use and handling of instruments and equipment. Enrollment is limited to 25.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 1:00-2:50 W. or Th.

Mr. FELLERS.

Prerequisite, Food Technology 51.

61. (I) INDUSTRIAL TECHNOLOGY.—A survey of commercial practices in the manufacture and preservation of food products. This will involve a study of equipment, factory arrangement, sanitation, government regulations, and the operation of types of commercial equipment in quantity production.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

10:00-10:50 Th.; 1:00-4:50 M. or Tu.

Mr. LEVINE.

Prerequisites, Food Technology 52; Bacteriology 31.

62. (I) INDUSTRIAL TECHNOLOGY.—This is a continuation of Course 61. The class exercises will deal largely with a survey study of the sources of raw material, commercial methods of manufacture, packing and distribution of the more common foods. The important contributions of research to food technology will be studied. Laboratory work will include the formation of research projects, interpretation of research data, the use of preservatives, the simple analysis of foods and the commercial practices as applied to preservation of such materials as are available: fish, meats, poultry, and spring vegetables. The inspec-

* On leave of absence for military service.

tion and grading of canned food will be studied. Sometime during the semester a two-day field trip to food plants in the Boston area will be taken. The trip will cost the student about fifteen dollars.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. LEVINE.

Prerequisite, Food Technology 61.

71. (I) 72. (II) FOOD SCIENCE LITERATURE.—For seniors who specialize in food technology.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

THE DEPARTMENT.

75. (I) and (II) FOOD PRESERVATION.—For students not majoring in food technology. A survey is made of the causes of food spoilage and of the methods commonly used in preserving foods. The important food products are discussed with emphasis on raw materials used, processing methods and examination of packaged foods. Methods of detecting and preventing spoilage are studied. The laboratory exercises cover the preservation of the major food groups. The theory and use of the pressure cooker are included.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

12:00-12:50 Tu. Th.; 3:00-4:50 M. or Th.

Mr. NEBESKY.

82. (II) CONFECTIONS AND CEREAL PRODUCTS.—The materials offered in this course are as follows: the home manufacture of fruit preserves, candied and glacéed fruits, pastes, confections, candies, and other specialties. Approximately one-half the semester is devoted to elementary work in candy making. This course will also consider the principles of baking, doughs, various cereal products and dry mixes.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 M. F. or 3:00-4:50 M. F.

Mr. LEVINE.

85. (I) 86. (II) MARINE PRODUCTS TECHNOLOGY.—A survey of marine products of commerce and industry. Canning, curing, and freezing of seafoods. Chemical and microbiological aspects of the industry. By-products, industrial problems and scientific literature. Emphasis is placed on the New England fisheries.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Mr. FELLERS.

91. (I) ANALYSIS OF FOOD PRODUCTS.—Laboratory studies on the grading of foods, examination of foods for adulteration, testing accessory products for quality, and determining the causes of spoilage or deterioration in processed food products. Physical, chemical, microbiological, and microscopical methods will be employed. Enrollment limited to 18.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS.

Prerequisites, Food Technology 52; Bacteriology 31; Chemistry 30.

92. ((II) EXAMINATION OF FOOD PRODUCTS.—For students specializing in food technology. This is a continuation of Course 91. It includes interpretation of analysis, sanitation and food laws, government grading of processed foods, use of manuals and the technical work of trade associations. Laboratory work includes use of all kinds of laboratory and field equipment and apparatus used in food plants. A separate laboratory section is given for Bacteriology and Public Health majors.

1 class hour; 1 4-hour laboratory period.
9:00-9:50 Th.; 1:00-4:50 Th. or F.

Credit, 3.

Mr. FELLERS, Mr. NEBESKY.

Prerequisite, Food Technology 91.

95. (I) and (II) INTRODUCTORY RESEARCH METHODS.—For food technology majors. The application of the fundamental sciences to food technology research.

Hours by arrangement.

Credit, 2.

THE DEPARTMENT.

FORESTRY AND WILDLIFE MANAGEMENT

Professor HOLDSWORTH, Professor TRIPPENSEE, Professor RHODES, Associate Professor RICH, Assistant Professor STICKEL, Mr. COLE,*

Mr. GANLEY, Mr. MACCONNELL.

26. (II) DENDROLOGY.—The taxonomic features, silvical characteristics and geographical distribution of the principal forest trees of temperate North America, and the description of the forests in which they occur; identification of the native and naturalized woody plants occurring in the forests of the Northeastern United States, in summer and winter condition, by means of keys and first-hand examination.

2 class hours; 2 2-hour laboratory and field periods.

Credit, 3.

Mr. RHODES.

51. (I) FOREST MANAGEMENT OF WATERSHEDS.—For students majoring in bacteriology and public health. Admission on recommendation of student's major adviser. A study of forest site—water factor relationships; the improvement of watershed forests through applied silviculture; relative suitability of tree species for watershed uses; forest protection measures.

3 class hours; special field trips.

Credit, 3.

THE DEPARTMENT.

52. (II) FOREST PHOTOGRAMMETRY.—A course designed to familiarize the student with the use of aerial photographs in present-day forest management practice. Map making, forest inventory and other phases of forest management involving the application of photogrammetry are considered in detail. Field trips for checking photographic detail on the ground will be made. Texts and equipment costing about \$22.00 are required.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Mr. MACCONNELL, Mr. COLE.

* On leave of absence for military service

53. (I) **SILVICS.**—Forest ecology as a foundation for silvicultural practice: the physiological basis of forest ecology; environmental factors, their effect upon vegetation, and how they are influenced by it; the development and silvical habits of the individual tree; the development, characteristics and classification of forest communities; plant indicators; methods for the study and analysis of vegetation and its environment.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.
Mr. RHODES.

54. (II) **FOREST SOILS.**—The structure, development and maintenance of forest soils; their relationship to applied silviculture and forest productivity; the literature of forest soils with special reference to American experience.

3 class hours.

Credit, 3.
Mr. RHODES.

55. (I) **THE ELEMENTS OF FOREST MENSURATION.**—Methods of determining the volume and value of the forest growing stock; type mapping as it pertains to timber cruising; methods of predicting growth of trees and stands; the field work includes mapping and timber estimating on a forest realistic in size and condition and the submission of an inventory report.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.
Mr. HOLDSWORTH, Mr. COLE.

56. (II) **THE PRINCIPLES OF SILVICULTURE.**—The methods of establishing and developing forest stands through the application of correct silvicultural practice. Intermediate cuttings and reproduction systems. Field work in applied silviculture, including the marking of forest stands for silvicultural treatment, is given on University forest property.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.
Mr. HOLDSWORTH, Mr. RHODES, Mr. STICKEL.

57. (I) **FOREST ECONOMICS AND POLICY.**—This course considers the forest as a resource yielding direct forest values and social benefits. The history of American forestry and the development of a forest policy together with the role of the forest in American economy are considered. Principles of American forest valuation.

3 class hours.

Credit, 3.
Mr. HOLDSWORTH.

59. (I) **FOREST PROTECTION.**—The principles of protecting forests from all harmful agencies but with special reference to the prevention and control of forest fires, insects, and disease. Other agencies are treated in accordance with their importance.

3 class hours.

Credit, 3.
Mr. STICKEL.

66. (II) WOOD ANATOMY AND IDENTIFICATION.—A basic anatomical study of wood elements, their various structural characteristics and functions. Relation of structure and properties to use. Microscopic study of wood elements. Practice in identification.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. RICH.

75. (I) MANUFACTURE AND DISTRIBUTION OF FOREST PRODUCTS.—A study of the techniques of manufacturing direct forest products, including production and cost studies; also the seasoning, grading and special processing prerequisite to marketing.

3 class hours.

Credit, 3.
Mr. RICH.

76. (II) WOOD TECHNOLOGY.—The structure, composition and properties of wood in relation to its economic utilization; wood-liquid relationships as they affect seasoning, preservation, and technological processes for industrial purposes. A survey of the technological advances in the use of wood.

3 class hours.

Credit, 3.
Mr. RICH.

78. (II) HARVESTING OF FOREST PRODUCTS.—Methods of harvesting forest products in the several forest regions of the United States with a study of the uses of modern machinery and techniques. Cost control as a factor in the development of harvesting methods and policies.

3 class hours.

Credit, 3.
Mr. RICH.

80. (II) PRINCIPLES OF FOREST MANAGEMENT.—The organization of the forest for sustained yield management with a study of the underlying principles. Forest regulation. The preparation of forest management plans.

2 class hours; 1 4-hour field and laboratory period.

Credit, 3.
Mr. MACCONNELL.

81. (I) REGIONAL SILVICULTURE.—The practice of silviculture as applied in the several forest regions of the United States with special reference to the treatment of the tree species of commercial importance. Emphasis is given to the factors, both natural and economic, which govern silviculture in these regions.

3 class hours.

Credit, 3.
Mr. RHODES.

82. (II) SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY.—A study of forest tree seeds and their characteristics, production, harvest, storage, and qualities of germination. The production, distribution, and forest use of planting stock.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. STICKEL.

85. (I) AIR SEASONING AND KILN DRYING.—A study of the proper conditioning of wood products by air seasoning and kiln drying. Laboratory work includes studies of moisture relations in the wood and a study of kiln operation.

3¹/₂ class hours.

Credit, 3.
Mr. RICH.

Wildlife Management

27. (I) CONSERVATION OF NATURAL RESOURCES.—Natural resources of the United States including soil, water, forests, wildlife, and the important minerals, the historic background of their use and their present status in relation to the social and economic welfare. Includes the discussion of various conservation problems in relation to national prosperity.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

70. (II) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of common game birds and mammals. Includes a study of natural habitats and methods of management.

1 class hour; 2 2-hour laboratory periods.

3:00-4:50 W. F.; lecture by arrangement.

Credit, 3.
Mr. TRIPPENSEE

71. (I) WILDLIFE MANAGEMENT (1952-53).—Life histories, ecology, and management of waterfowl. Includes a study of natural habitats and method of management. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. TRIPPENSEE.

72. (II) FOREST-ANIMAL RELATIONSHIPS.—Only for students majoring in Forestry. Effects of animals on the forest; the effects of forest practices on wild animal production; economic aspects of forest-animal relationships.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

73. (I) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of predaceous birds and injurious mammals. Particularly designed for those who seek employment with rodent control division of Fish and Wildlife Service.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. TRIPPENSEE.

74. (II) TECHNIQUES IN WILDLIFE MANAGEMENT.—Admission by permission of instructor. Quantitative field studies of wild animals of forest and farm. Includes cover mapping, habitat studies, census, food habits, and damage of game animals. For students interested in state and federal employment through civil service.

1 class hour; 1 4-hour laboratory period.

1:00-1:50 W.; 1:00-4:50 M.

Credit, 3.
Mr. TRIPPENSEE.

75. (I) WILDLIFE MANAGEMENT (1951-52).—Life histories, ecology, and management of the furbearers. Includes a study of natural habitats, management and fur farm problems. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.

Mr. TRIPPENSEE.

84. (II) SEMINAR.—Study and discussion of problems in relation to agriculture, forestry, and the use and control of wildlife resources. For seniors majoring in wildlife management.

3 class hours.

Credit, 3.

Mr. TRIPPENSEE.

GEOLOGY AND MINERALOGY

Professor WILSON, Assistant Professor NELSON,

Mr. JOHANSSON, Mr. LIGHT, Mrs. ROTAN.

27. (I) PHYSICAL GEOLOGY.—An introduction to the agents and processes that modify the earth's crust. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

28. (II) HISTORICAL GEOLOGY.—A survey of geological time, stressing the development of continents and the history of plants and animals. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

50. (I) ENGINEERING GEOLOGY.—A general course in engineering geology stressing earth structure, the dynamic processes, and agents of weathering. The laboratory work consists of mineral and rock-determination and map-reading as related to the phenomena of physical geology.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. LIGHT.

51. (I) MINERALOGY.—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

52. (II) PETROLOGY.—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

54. (II) ECONOMIC GEOLOGY.—A course dealing with the origin, classification, and uses of metallic and non-metallic mineral deposits.

3 class hours.

Credit, 3.

Mr. NELSON.

61. (I) GEOMORPHOLOGY (1950-51).—A review of recent studies concerning rock structures, weathering, underground water, streams, alpine and continental glaciers, shorelines, and wind work. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. WILSON.

62. (II) GEOMORPHOLOGY (1950-51).—A review of recent studies concerning the physical geological role of organisms, coastal plains, plains and plateaus, volcanoes, dome, block, folded and complex mountains. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. WILSON.

63. (I) INVERTEBRATE PALEONTOLOGY.—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. JOHANSSON.

64. (II) PLANT PALEONTOLOGY.—A study of the history, development, and identification of plant fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. WILSON.

71. (I) 72. (II) SPECIAL PROBLEMS.—For seniors specializing in geology.

6 laboratory hours.

Hours by arrangement.

Credit, 3.
THE DEPARTMENT.

73. (I) STRUCTURAL GEOLOGY (1952-53).—A study of the origin of rock structures, their occurrence, and recognition. Field and laboratory problems emphasize the structure present in the Connecticut valley. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. LIGHT.

74. (II) PRINCIPLES OF STRATIGRAPHY (1952-53).—An examination of the principles of stratigraphic correlation and their application to the problems of the major rock units of the United States. Field and laboratory work consists primarily of problems related to the eastern United States. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. WILSON.

GERMAN

Professor ELLERT, Associate Professor GOLDSMITH, Mr. TIBBETTS, † Mr. STAWIECKI, Mr. HILL, Mr. MORGAN.

1. (I) 2. (II) ELEMENTARY GERMAN.—Grammar, prose composition, and reading. No credits in this course may be applied toward a

† On leave of absence.

degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours.

Credit, 3.

THE DEPARTMENT.

5. (I) 6. (II) ADVANCED GERMAN PROSE.—Reading of representative German authors. Grammar review.

3 class hours.

Credit, 3.

8:00-8:50 Tu. Th. S.

Mr. STAWIECKI.

Prerequisite, Entrance German.

25. (I) 26. (II) INTERMEDIATE GERMAN.—German prose and poetry; the simple German drama; grammar review and advanced prose composition. Simpler passages of prose and poetry to commit to memory.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, German 1 and 2.

51. (I) 52. (II) NINETEENTH CENTURY LITERATURE.—A survey of German thought in the Nineteenth Century.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

55. (I) 56. (II) "STORM AND STRESS" AND ROMANTICISM.—The "Storm and Stress" period of German literature, with study of the early plays of Goethe and Schiller. The Romantic period from Novalis to Heine, with study of poets, prose writers, critics, and philosophers.

3 class hours.

Credit, 3.

10:00-10:50. Tu. Th., 2:00-2:50 F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

57. (I) 58. (II) GOETHE'S FAUST.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

59. (I) 60. (II) THE CLASSICAL PERIOD.—Reading and study of some important literary productions of the classical period.

3 class hours.

Credit, 3.

8:00-8:50 Tu. Th. S.

Mr. GOLDSMITH.

Prerequisites, German 25 and 26.

79. (I) 80. (II) CONVERSATIONAL GERMAN.—Admission only by arrangement with the head of the department. Practice in the oral use of German, based on reading material prepared in advance.

3 class hours.

Credit, 3.

3:00-4:50 Tu. Th.

THE DEPARTMENT.

Prerequisites, German 25 and 26.

81. (I) 82. (II) SCIENTIFIC GERMAN.—Only seniors admitted, except by permission of the instructor. Intensive and specialized reading of literature taken from standard German scientific journals and reference books.

3 class hours.

9:00-9:50 M. W. F.

Prerequisites, German 25 and 26.

Credit, 3.

Mr. MORGAN.

GOVERNMENT

Associate Professor MITCHELL, Assistant Professor FERWERDA,* Assistant Professor GOODWIN, Mr. WALKER, Mr. MATTHEWS.

25. (I) and (II) AMERICAN GOVERNMENT.—A study of the principles, machinery, dynamics and problems of American national government.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) STATE AND LOCAL GOVERNMENT.—A survey of the governmental structure and functions of the American state and its local governments, with emphasis on state-local relationships.

3 class hours.

Credit, 3.

THE DEPARTMENT.

52. (II) EUROPEAN GOVERNMENT.—A comparative study of the politics and institutions of Great Britain, France, Russia, and other European governments.

3 class hours.

Credit, 3.

Mr. MATTHEWS.

61. (I) PUBLIC ADMINISTRATION.—A general survey of the field of public administration. Special emphasis will be placed on the principles of organization, the functions performed by administration, and the relation of administration to democracy.

3 class hours.

Credit, 3.

Mr. MITCHELL.

62. (II) ADMINISTRATIVE LAW.—A study of government regulatory activities in relation to industry, agriculture, and labor, with emphasis on the legal framework within which these activities operate.

3 class hours.

Credit, 3.

Mr. GOODWIN.

63. (I) POLITICAL PARTIES AND ELECTIONS.—A study of the American political process, with emphasis on parties, pressure groups, and public opinion.

3 class hours.

Credit, 3.

Mr. GOODWIN.

64. (II) MUNICIPAL GOVERNMENT.—A survey of the governmental structure and function of American municipalities. Special attention is

* On leave of absence for military service

given to such functions as protection, education, welfare, correction, city planning and zoning.

3 class hours.

Credit, 3.

Mr. MITCHELL.

65. (I) CONSTITUTIONAL LAW.—An historical study of the American Constitution as interpreted by decisions of the Supreme Court.

3 class hours.

Credit, 3.

Mr. GOODWIN.

66. (II) AMERICAN POLITICAL THOUGHT.—A study of the development of American political thought from colonial times to the present.

3 class hours.

Credit, 3.

Mr. WALKER.

67. (I) INTERNATIONAL GOVERNMENT.—A study of international organization in the twentieth century, with emphasis upon the United Nations and regional organizations.

3 class hours.

Credit, 3.

Mr. WALKER.

68. (II) INTERNATIONAL LAW.—A study of the origin, character, and function of international law.

3 class hours.

Credit, 3.

Mr. WALKER.

71. (I) ANCIENT AND MEDIEVAL POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the time of the Greeks to the end of the Middle Ages.

3 class hours.

Credit, 3.

Mr. MITCHELL.

72. (I) MODERN POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the rise of the modern state to the present.

3 class hours.

Credit, 3.

Mr. MITCHELL.

93. (I) 94. (II) SEMINAR.—A study of special problems in the field of government. For seniors only.

3 class hours.

Credit, 3.

THE DEPARTMENT.

HISTORY

Professor CALDWELL, Professor CARY, Assistant Professor DAVIS,

Assistant Professor ZEENDER, Assistant Professor BOAS,

Mr. CARNES, Mr. POTASH, Mr. ASHTON

5. (I) 6. (II) MODERN EUROPEAN CIVILIZATION.—The first semester covers the period from the later Middle Ages to 1815; the second semester, the period from 1815 to the present. These courses are required for candi-

dates for the B.A. degree but may be elected independently by other students.

3 class hours.

Credit, 3.

THE DEPARTMENT.

31. (I) 32. (II) ENGLISH HISTORY.—Emphasis on economic, social, and cultural influences, as well as on constitutional development. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. CALDWELL, Mr. CARNES.

51. (I) ANCIENT HISTORY.—A general survey of Mesopotamian, Egyptian, Greek, and Roman history. Emphasis will be on political institutions, economic conditions and intellectual achievements.

3 class hours.

Credit, 3.

Mr. DAVIS.

53. (I) INTERNATIONAL RELATIONS.—The nation-state system and conceptions of national interest in modern world politics. The forms and distribution of power by which states seek to implement national interests. The making of foreign policy and methods of adjusting international conflict. Attention will be given to current international problems.

3 class hours.

Credit, 3.

Mr. CARNES.

54. (II) THE FAR EAST (1952-53).—A general historical introduction to the civilization and contemporary problems of China and Japan. The first half covers the traditional civilization of China and Japan and the early impact of the west to 1890. The second half deals with revolutionary developments of the twentieth century and the place of the Far East in the world balance of power.

3 class hours.

Credit, 3.

Mr. ASHTON.

56. (II) HISTORY OF RUSSIA (1953-54).—A general historical introduction to the civilization and contemporary problems of Russia. Growth of the Russian state, society, culture and ideology, and their relations to the non-Russian world. Emphasis on the Soviet period.

3 class hours.

Credit, 3.

Mr. ASHTON.

57. (I) 58. (II) HISPANIC-AMERICAN HISTORY.—A general course in the history and civilization of the Americas south of the United States. The first semester deals with the period of exploration, the evolution of colonial life and institutions, and the growth of the independence movement to 1824; the second semester with the period of national development from the revolutions to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. POTASH.

59. (I) 60. (II) HISTORY OF THE UNITED STATES.—A survey of the national development including political, social, economic, and cultural

factors in the growth of American democracy. The first semester covers the period to 1865; the second, from 1865 to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.
Mr. CARY.

65. (I) NINETEENTH AND TWENTIETH CENTURY ENGLAND (1953-54).—A topical study of England since 1815. Emphasis is given to social change and to movements of thought. Subjects treated include: Victorian society and ideals; growth of democracy; imperial development; socialist Britain. Considerable biographical reading. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 32.

67. (I) TUDOR AND STUART ENGLAND (1952-53).—A brief survey of the Tudor Period followed by a detailed study of Early Stuart England. Emphasis is placed on social, religious, and intellectual aspects of English life in the period. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 31 or 32.

69. (I) EUROPE, 1870-1918.—Internal developments of the principal countries, including political and economic changes, social unrest, and intellectual currents; the development of imperialism; a detailed study of conditions and diplomacy which led to the World War; military history of the War.

3 class hours.

Credit, 3.
Mr. ZEENDER.

Prerequisite, History 6.

70. (II) EUROPE SINCE 1918.—Approximately half of the course is devoted to international affairs, including the Peace Settlement, the development of German, Italian, and Japanese aggression, and World War II. The other half of the course is a study of internal developments in the principal European nations.

3 class hours.

Credit, 3.
Mr. CALDWELL.

72. (II) HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893.—Advance of settlement from the Appalachians to the Pacific and influence of the frontier upon social, economic, and political conditions in the country as a whole.

3 class hours.

Credit, 3.
Mr. DAVIS.

Prerequisite, History 59.

75. (I) MEDIEVAL EUROPE.—Europe from the barbarian invasions to the Renaissance. Social and economic conditions, development of national monarchies, the Church and religion, medieval culture.

3 class hours.

Credit, 3
Mr. ZEENDER.

76. (II) HISTORY OF THE RENAISSANCE.—The later Middle Ages; the Church at the height of power; the rise of nationalities; the Italian towns; the New Learning and its relation to art, science, invention, geographical discoveries; spread and effects of the Renaissance.

3 class hours.

Credit, 3.

Mr. ZEENDER.

77. (I) 78. (II) THE HISTORY OF SCIENCE IN WESTERN CIVILIZATION.—This course will trace the growth of the community of science as it exists in the world today. Emphasis will be placed upon the mutual relations between science and the economic, social, and intellectual forces in society at large.

2 class hours.

Credit, 2.

Miss BOAS.

81. (I) DIPLOMATIC HISTORY OF THE UNITED STATES. 1776-1900.—Basic problems in American foreign policy to the end of the nineteenth century.

3 class hours.

Credit, 3.

Mr. CARY.

82. (II) DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900.—The history of the United States as a world power.

3 class hours.

Credit, 3.

Mr. CARY.

Prerequisites, History 59 and 60 or permission of instructor.

91. (I) HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians.

1 class hour.

Credit, 1.

Mr. CARY.

92. (II) SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports.

1 class hour.

Credit, 1.

Mr. CARY.

HOME ECONOMICS

Professor MITCHELL, Associate Professor BRIGGS, Assistant Professor MERRIAM, Assistant Professor COOK, Assistant Professor PIATT, Assistant Professor ———, Assistant Professor DAVIS, Mrs.

THIES, Mrs. WILHELM, Miss DAVEY, Miss HANSON.

1. (I) INTRODUCTION TO HOME ECONOMICS.—The course introduces the student to the objectives in Home Economics and the fields of specialization for which it prepares. Consideration is given to a philosophy of living which emphasizes the responsibility of a woman to her family, to her community wherever she is, and to the world. Introductory work is offered in food and nutrition, child development and family life. Laboratory work includes food selection and simple preparation, and observation in the Nursery School.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

2. (II) CLOTHING SELECTION.—A study of the principles of clothing selection in order to assist each student to choose satisfactorily line, color, and texture. Fundamentals of construction for cotton and linen. 1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mrs. WILHELM, Miss HANSON.

26. (II) TEXTILES.—A study of fiber, yarn, finish, color and design. Acquaintance with a wide variety of fabrics is afforded to develop judgment in buying and using materials for clothing and home furnishing. 2 class hours; 1 2-hour laboratory period. Credit, 3.

Miss BRIGGS.

30. (II) FOOD SCIENCE AND PREPARATION.—A study of the fundamental scientific principles and comparative methods of food preparation. The nutritional and economic aspects of foods are also stressed. 2 class hours; 1 3-hour laboratory period. Credit, 3.

Miss DAVIS, Miss DAVEY.

31. (I) APPLIED ART.—Art principles are studied with many practical applications for selecting and arranging. Specific problems in decorating cloth, wood, and leather afford opportunity for individual expression.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss BRIGGS.

35. (I) CLOTHING CONSTRUCTION.—Advanced construction and fitting problems with emphasis on new fabrics.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM, Miss HANSON.

Prerequisite, Home Economics 2 or equivalent.

51. (I) FOOD SELECTION AND MEAL PLANNING.—Meal planning, serving and etiquette and emphasis on well-balanced meals as to nutritive value and economy of money, time, and labor in preparation. Further study of food principles and techniques of cookery and a unit in food preservation.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Miss DAVIS, Miss DAVEY.

Prerequisite, Home Economics 30; Chemistry 31.

52. (II) NUTRITION AND DIETETICS.—A study of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides for further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc. is given consideration.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mrs. COOK.

Prerequisites, Home Economics 30; Chemistry 31 and Zoology 1 or 35.

54. (II) NUTRITION.—For students who are not majoring in Home Economics and who do not have prerequisites for Home Economics 52.

This course is designed to interpret the technical knowledge of foods and nutrition in terms of its practical application for optimum health.
2 class hours.

Credit, 2.
Mrs. COOK.

56. (II) FOOD PREPARATION AND MEAL PLANNING.—For students not majoring in home economics. This course is designed to meet the needs of those who wish a general knowledge of the basic food principles. It includes latest methods and techniques of cookery, conservation of nutrients, menu planning and food preparation, buying of food, consumer education and table service, decoration and etiquette. It is recommended for students who want a scientific as well as practical knowledge of food and its preparation for everyday use.
2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss DAVEY.

57. (I) CLOTHING SELECTION AND SIMPLE CONSTRUCTION.—For students not majoring in home economics. This course is designed to stimulate an interest in good workmanship. Emphasis is given to construction technique such as fitting, pattern use and altering.
1 class hour; 1 3-hour laboratory period.

Credit, 2.
Miss HANSON.

60. (II) HOUSEHOLD EQUIPMENT AND DEMONSTRATION TECHNIQUES.—Selection, care and operation of household equipment and the study of the mechanical principles involved. Student demonstrations given for practice with all types of equipment. Study of home lighting and wiring. Outside demonstrations and field trips are planned.
2 class hours; 1 2-hour laboratory period.

Credit, 3.
Miss MERRIAM.

62. (II) HOME FURNISHING.—A study of the fundamental principles which underlie the successful planning and furnishing of a satisfying home. A study of period homes and furnishings is included. Many applications of these principles are worked out in practical problems.
1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Miss BRIGGS.

70. (II) CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, aspects and behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in nursery work.
3 class hours; 1 1-hour laboratory period.

Credit, 3.
Mrs. THIES.

71. (I) RETAIL FOOD BUYING.—This course is offered jointly by the departments of olericulture, animal husbandry, and poultry husbandry for all students interested in retail marketing. First 5 weeks: vegetables and fruits, retail buying, varieties and adaptability to various uses, season of availability, grades, packs and packages. Second 5 weeks: poultry and eggs—dressed poultry is graded and prepared in various ways for the table and home freezing. Demonstrations are given of handling and market classification of eggs. Third 5 weeks: meats—demonstration and

laboratory practices in identification and classification of meat cuts, in preservation (freezing and curing) and in judging quality.
2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 3:00-4:50 Tu.

Mr. SNYDER, Mr. VONDELL, Mr. HALE.
Miss DAVIS, coordinator.

75. (I) ECONOMICS OF THE HOUSEHOLD.—A study of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation.
3 class hours. Credit, 3.
Miss MERRIAM.

77. (I) and (II) HOME MANAGEMENT PRACTICE.—Successive groups of seniors live in the home management house or apartment and assume responsibilities involved in managing a home. Meals are planned on low, medium, and high income levels.
Credit, 3.
Miss MERRIAM, Miss DAVEY.

Prerequisites, Home Economics 51, 52, and 75, or by special permission.

80. (II) FAMILY LIFE.—A study of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.
3 class hours. Credit, 3.
Mrs. PIATT.

81. (I) METHODS OF TEACHING HOME ECONOMICS.—A study of the philosophy of general education; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers.
3 class hours. Credit, 3.
Mrs. PIATT.

83. (I) and (II) STUDENT TEACHING IN HOME ECONOMICS.—Observation and supervised teaching are carried on in the home economics classes in the nearby junior and senior high schools.
Credit, 3.
Mrs. PIATT, Miss MERRIAM, Miss HANSON.

Prerequisite, Home Economics 81 or its equivalent.

85. (I) THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.—This course is planned to give students a background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature, and science; fundamentals of play and use of play materials, and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.
2 class hours; 1 3-hour laboratory period. Credit, 3.
Mrs. THIES.

Prerequisite, Home Economics 70.

87. (I) PRINCIPLES AND PRACTICES OF TAILORING.—Emphasis on handling of wool in the making of suits and coats.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

88. (II) APPLIED DRESS DESIGN.—Costume design through draping and pattern making. An intensive study is made of texture, line, color and fit as applied to dress design and the figure.

3 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

89. (I) DIET THERAPY.—The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease and at the same time be open-minded regarding new developments in this field. Scientific and medical terminology is emphasized.

3 class hours.

Credit, 3.

Mrs. COOK.

Prerequisites, Home Economics 52; Chemistry 79; Zoology 35.

90. (II) NUTRITION SEMINAR.—For qualified seniors. Reading and oral reports of scientific literature and preparation of bibliographies.

1 class hour.

Credit, 1.

Mrs. COOK.

91. (I) 92. (II) INSTITUTIONAL FOODS AND MANAGEMENT.—For qualified juniors or seniors interested in institutional food service. A study of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special functions of the dietitian. Laboratory work at one of the university dining halls. It is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Accounting 25 and Home Economics 71.

1 class hour; 1 5-hour laboratory period first sem.

Credit, 3.

2 class hours, 1 3-hour laboratory period 2nd sem.

Prerequisites, Home Economics 51 and 52.

93. (I) EXPERIMENTAL FOODS.—The testing and comparing of different food materials and methods of preparation, including advanced work in the science and techniques of cookery. Special individual problems will be studied. The course is helpful to those interested in commercial food testing and valuable to those wishing to develop a scientific approach to the study of foods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Miss DAVIS.

Prerequisites, Home Economics 30 and permission of instructor.

95. (I) CHILD NUTRITION.—A study is made of nutritional needs from prenatal life through infancy and childhood. Methods of judging

nutrition, also causes and effects of malnutrition are discussed. Menus for children and measures to insure the consumption of optimal diets are put in practice with laboratory work in the Nursery School.

3 class hours. Laboratory by arrangement.

Credit, 3.
Mrs. Cook.

Prerequisite, Home Economics 52 or 54.

98. (I) and (II) PROBLEMS IN HOME ECONOMICS.—An intensive study of some phase of home economics. By permission of the Dean of the School.

Credit, 3.
HOME ECONOMICS STAFF.

HYGIENE

HYGIENE.—All freshmen are required to attend a series of lectures on personal hygiene. For men students these lectures are included in the Military program; for women students they are scheduled as a separate course.

Credit, 1.
THE HEALTH SERVICE STAFF.

JOURNALISM

Professor MUSGRAVE.

85. (I) INTRODUCTION TO JOURNALISM.—A basic course in reporting designed to acquaint the student with the scope, principles, and practice of contemporary journalism. Stress is placed upon the role of the press as a social institution and upon the relationships between a general education and effective journalism.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

86. (II) FEATURE ARTICLE WRITING.—Instruction in writing feature or magazine articles, combined with some of the material of a course in advanced reporting. The practice work is related to problems of interpretative writing, communication, and public opinion. Each student is expected to publish a feature article in a newspaper or magazine.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

LANDSCAPE ARCHITECTURE

Professor OTTO, Professor BLUNDELL, Assistant Professor McLINDON, Mr. PROCOPIO, Mr. MACIVER, Mr. HAMILTON.

Landscape Architecture

25. (I) FREEHAND DRAWING AND ELEMENTARY DESIGN.—For majors in landscape architecture. The work in this course is to supply the student with technical aspects of freehand drawing and design necessary to proficiency in that field.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

26. (II) **LANDSCAPE DRAFTING.**—This course continues the work in Landscape Architecture 25, but draws on the mechanical aspects of the designers problems and includes simple projections—orthographic, perspective, and isometric—and architectural shades and shadows.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. MACIVER.

51. (I) **ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.**—Contour interpolation, grading and drainage plans, drive design, profiles and sections, computation of earth work. Application of surveying to landscape construction.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. PROCOPIO.

Prerequisites, Civil Engineering 27; Landscape Architecture 26.

52. (II) **CONSTRUCTION DETAILS.**—A series of problems in architectural garden features as walks, steps, walls, gates, pools, and small structures.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. PROCOPIO.

Prerequisite, Landscape Architecture 51.

53. (I) **GARDEN DESIGN.**—Fundamental principles of composition with application to problems in the design of gardens and small home grounds.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 25 and 26 or permission of the instructor.

54. (II) **GENERAL DESIGN.**—A series of problems in the design of small properties, estates and parks. Members of this class will be required to take a two-day field trip to visit typical examples of design; approximate cost, \$8.00.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 51, 53, and concurrently 52.

76. (II) **CIVIC ART.**—A survey of the principles and applications of modern civic art, including city planning, regional planning and the design of various types of land areas.

2 3-hour laboratory periods.

Credit, 3.

Mr. OTTO.

Prerequisites, Landscape Architecture 51 and 52.

79. (I) **CONSTRUCTION AND MAINTENANCE (1951-52).**—A study of construction methods and the maintenance of estate, park, and recreation areas. Given in alternate years.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. PROCOPIO.

80. (II) **HISTORY AND LITERATURE OF LANDSCAPE ARCHITECTURE.**—A review of the significant history and literature of landscape architecture and the allied fields of city planning, regional planning and highway

improvement. Compilation of bibliographies on various phases of these fields.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. HAMILTON.

81. (I) 82. (II) ADVANCED DESIGN.—Class B Exchange Problems plus specialized study of landscape details and a summary of general design. Members of the class may be required to take a two-day field trip to visit typical examples of design; approximate cost, \$10.00.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. HAMILTON.

Prerequisites, Landscape Architecture 53 and 54.

83. (I) ARCHITECTURE (1952-53).—The history of architectural development, including styles of architecture and construction principles of value to the landscape architects when working with architectural problems. Given in alternate years.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. McLINDON.

84. (II) SKETCHING.—Drawing and sketching in various mediums from outdoor and indoor subjects.

2 2-hour laboratory periods.

Credit, 2.

Mr. _____.

Horticulture

1. (I) PLANT PROPAGATION.—This course serves as an introduction to the field of horticulture, emphasizing the methods and principles involved in the propagation of horticultural plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. THAYER, Mr. PROCOPIO.

26. (II) PLANT MATERIALS.—Detailed study of deciduous and evergreen trees, with special reference to their mature form and character, means of identification, natural associations, and uses of the various types of trees in landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

51. (I) PLANT MATERIALS.—Detailed study of shrubs and woody vines, and their identification, with especial emphasis being given to their adaptability to the various landscape uses, methods of handling, and care.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

52. (II) PLANTING DESIGN.—A study of the utilization of plant materials in combination as applied to the many conditions and demands of landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

Prerequisites, Horticulture 26 and 51.

LATIN

51. (I) 52. (II) LATIN.—A course in elementary Latin. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.
3 class hours. Credit, 3.

Mr. _____.

55. (I) 56. (II) LATIN.—A college survey of classical Latin literature: epic (Virgil), lyric (Catullus and Horace), comedy (Plautus), oratory (Cicero), and philosophy (Lucretius). The list may be varied according to the needs of particular classes.
3 class hours. Credit, 3.

Mr. _____.

Prerequisites, Latin 51, 52 or 2 years of high school Latin.

MATHEMATICS

Professor ANDERSEN, Professor MACHMER, Professor WAGNER, Associate Professor BOUTELLE, Assistant Professor SCHOONMAKER, Assistant Professor ROSE, Assistant Professor CULLEN, Mr. BUZZELL, Mr. SKILLINGS, Mr. RITGER,† Mr. ALLEN, Mr. MIENTKA, Mr. MOSER, Mr. HALPERN, Mr. KHEIRALLA, Mr. BUSSEL.

01. (I) ELEMENTARY COLLEGE ALGEBRA.—A course intended for those students who offer only one unit of algebra for entrance. It contains a review of elementary algebra and a more thorough study of such topics as quadratic equations, exponents and radicals, and progressions. No college credit is given for this course, but the successful completion of this course and Mathematics 14 which follows in the second semester, may satisfy the freshman mathematics requirement unless the student's major requires further mathematics.
3 class hours. Credit, 0.

THE DEPARTMENT.

5. (I) INTRODUCTORY ENGINEERING MATHEMATICS.—Trigonometry and algebra: a rapid basic review, theory of equations, simple determinants and the slide rule. Plane analytic geometry: the straight line, conic sections, selected higher plane curves, polar coordinates and parametric equations.
4 class hours. Credit, 4.

THE DEPARTMENT.

6. (II) INTRODUCTORY CALCULUS FOR ENGINEERS.—Differentiation, with applications, technique of integration.
4 class hours. Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 5.

7. (I) ALGEBRA AND TRIGONOMETRY.—For all freshmen, except majors in Engineering, who are required to take a full year of college mathe-

† On leave of absence.

matics. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry.
3 class hours.

Credit, 3.

THE DEPARTMENT.

8. (II) ALGEBRA.—This course is designed for the freshmen who do not plan to proceed to Calculus. Theory of equations, progressions, mensuration, number systems, and the elements of statistics and mathematics of investments.
3 class hours.

Credit, 3.

THE DEPARTMENT.

10. (II) ALGEBRA AND ANALYTIC GEOMETRY.—This course is designed for the freshmen who plan to take Calculus. Theory of equations, binomial theorem, determinants of higher order, and plane analytic geometry.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 7.

12. (II) FUNCTIONAL MATHEMATICS.—For freshmen who are not required to take a full year of college mathematics. Fractions, percentage, linear and quadratic equations with applications, exponents, logarithms, slide rule, proportion, graphs, statistics, progressions, and the elements of mathematics of investments.

3 class hours.

Credit, 3.

Mr. SCHOONMAKER, Mr. ALLEN.

14. (II) TRIGONOMETRY AND ANALYTIC GEOMETRY.—A study of the essential elements of elementary trigonometry and of the elementary analytic geometry of the straight line and the conic sections.

3 class hours.

Credit, 3.

THE DEPARTMENT.

29. (I) DIFFERENTIAL CALCULUS.—The basic ideas and methods of the differential calculus.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10 or 27.

30. (II) INTEGRAL CALCULUS.—A continuation of Mathematics 29 into the field of the integral calculus, with special emphasis on application to problems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 29.

31. (I) APPLIED CALCULUS FOR ENGINEERS.—Area, volume, length of curve, centroid, moment of inertia, liquid pressure, work, partial differentiation.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 6.

32. (II) APPLIED CALCULUS FOR ENGINEERS.—Multiple integrals, infinite series, expansion of functions, hyperbolic functions, differential equations, elements of vector analysis.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 31.

51. (I) MODERN SYNTHETIC GEOMETRY.—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers.

3 class hours.

Credit, 3.

MR. ANDERSEN.

Prerequisite, Mathematics 30.

55. (I) MATHEMATICS OF FINANCE.—The mathematical principles of simple and compound interest, annuities, depreciation, valuation of bonds, insurance. The development and application of aids to computation in problems arising from financial transactions.

3 class hours.

Credit, 3.

10:00-10:50 Tu. S.; 11:00-11:50 Th.

MR. BOUTELLE.

Prerequisite, Mathematics 7.

60. (II) SPHERICAL TRIGONOMETRY AND SOLID ANALYTIC GEOMETRY (1951-52).—The trigonometry of the sphere with application to terrestrial and celestial problems. This is followed by a study of higher plane curves and the analytic representation of points, lines, and surfaces in space. Given in alternate years.

3 class hours.

Credit, 3.

MR. BOUTELLE.

Prerequisite, Mathematics 30.

62. (II) STATISTICS.—The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability curve, probable error, sampling, reliability.

3 class hours.

Credit, 3.

MR. BOUTELLE.

Prerequisite, Mathematics 10 or 27.

65. (I) THEORY OF EQUATIONS (1951-52).—An introduction to advanced algebra. A discussion of the conditions for and methods of solving algebraic and transcendental equations; ruler and compass constructions; systems of equations; determinants and matrices; symmetric functions; resultants; discriminants; invariants; the fundamental theorem of algebra. Given in alternate years.

3 class hours.

Credit, 3.

MR. BOUTELLE.

Prerequisite, Mathematics 10 or 27.

66. (II) INTRODUCTION TO HIGHER GEOMETRY (1951-52).—A study of various methods employed in the modern treatment of the geometry of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometrics, will be considered. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ANDERSEN.

Prerequisite, Mathematics 10 or 27.

71. (I) VECTOR ANALYSIS (1952-53).—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ANDERSEN.

Prerequisites, Mathematics 30; Physics 26.

72. (II) HISTORY OF MATHEMATICS (1952-53).—A study of mathematics as it has developed historically. Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ROSE.

Prerequisite, Mathematics 30.

91. (I) INTERMEDIATE CALCULUS.—Series, expansion of functions, partial differentiation, envelopes, and multiple integrals.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

92. (II) DIFFERENTIAL EQUATIONS.—

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

94. (II) ADVANCED CALCULUS.—A continuation of Mathematics 91. Line and surface integrals; Taylor's expansion; Fourier series; calculus of variations; Elliptic, Gamma, and Beta functions; continuity theorems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 91.

Astronomy and Meteorology

57. (I) METEOROLOGY.—A consideration of weather elements, air masses, frontal structures and storms, the construction and interpretation of weather maps and the general principles of weather forecasting.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. LANPHEAR.

58. (II) ASTRONOMY.—The course deals with a consideration of the atmosphere through which astronomical phenomena are observed; fundamental conceptions of the celestial sphere, the solar system, stars, galaxies. The chief objective is to make the student alive to the beauty and order revealed in the sky.

2 class hours.

8:00-8:50 Tu. Th.

Credit, 2.

Mr. LANPHEAR.

MILITARY SCIENCE AND TACTICS

Lieutenant Colonel ADAMS, PMS&T, Major WILLOUGHBY, Assistant PMS&T, Captain HERMAN, Assistant PMS&T.

1. (I) 2. (II) Theoretical and practical instruction in leadership, drill and exercise of command, individual weapons and marksmanship, hygiene and first aid, maps and aerial photographs, military organization, and the National Defense Act, ROTC regulations.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit 2.

ARMY INSTRUCTORS.

25. (I) 26. (II) Theoretical and practical instruction in leadership, drill and exercise of command, physical development methods, maps, and aerial photographs, military administration, evolution of warfare, military law and boards.

3 scheduled hours.

Credit, 2.

ARMY INSTRUCTORS.

51. (I) 52. (II) Theoretical and practical instruction in leadership, drill and exercise of command, military leadership, psychology and personnel management, Geographical foundation of national power, and military law and boards; tactics and technique of cavalry or armored units for students in the armored cavalry unit; tactics and techniques of the Army Air Forces for students in the air force unit.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

75. (I) 76. (II) Theoretical and practical instruction in leadership, drill and exercise of command, military teaching methods, military problems of the United States, psychological warfare, military mobilization and demobilization, command and staff operations; tactics and technique of cavalry or armored units for students in the armored cavalry unit; tactics and techniques of the Army Air Forces for students in the air force unit.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

AIR SCIENCE AND TACTICS

Lieutenant Colonel DEHORN, PAS&T, Major PRATT, Assistant PAS&T, Major BARRETT, Assistant PAS&T, Major GRAPENTINE, Assistant PAS&T, Major ZDROJKOWSKI, Assistant PAS&T, Captain SEARLE, Assistant PAS&T, Captain GAUMOND, Assistant PAS&T, Captain MCCARTHY, Assistant PAS&T, Lieutenant COLE, Assistant PAS&T, Lieutenant NATALE, Assistant PAS&T.

1. (I) 2. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, and a study of world political geography stressing its effect on the foreign policy of the United States, and how the Air Force implements that policy.

3 scheduled hours.

First semester, Credit, 3.
Second semester, Credit, 2.
AIR FORCE INSTRUCTORS.

25. (I) 26. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, maps and aerial photographs, personal maintenance, aerial navigation, meteorology, aerodynamics and propulsion systems, applied air power, and organization for the defense of the United States.

3 scheduled hours.

Credit, 2.
AIR FORCE INSTRUCTORS.

51. (I) 52. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, air operations, supply procedures, military publications. Engineering and Science majors pursue a course in Armament which consists of a study of aircraft weapons, electronics, atomic defense, guided missiles and pilotless aircraft. Business Administration majors pursue a course in Administration and Logistics which consists of a study of individual records, property and supply control, and transportation. All other majors may pursue a course in Flight Operations which consists of a study of the Air Force Major Commands, principles of flight, aircraft engineering, aircraft instruments, air navigation, meteorology and new developments.

5 scheduled hours.

Credit, 3.
AIR FORCE INSTRUCTORS.

75. (I) 76. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, military administration, Air Force inspection systems, military teaching methods, military law and boards, military management, logistics, and career development. Engineering and Science majors pursue a course in Armament which consists of a study of radar, fire control systems, gyro principles, theory of bombing, bomb sights and radar bombing equipment. Business Administration majors pursue a course in Administration and Logistics which consists of a study of the Air Comptroller, Food Service Supervisor and the administration of personnel of the Wing Base Staff. All other majors may pursue a

course in Flying Operations which includes a study in advanced navigation and bombing to include theory of radar, and duties and responsibilities of Electrical Counter Measure Officer, Radar Observer, and All Weather Fighter.

5 scheduled hours.

Credit, 3.

AIR FORCE INSTRUCTORS.

OLERICULTURE

Professor SNYDER, Assistant Professor TUTTLE, Mr. JOHNSON.

25. (I) GENERAL OLERICULTURE.—A study of the factors affecting the growth of plants which are essential to a basic understanding of the cultural requirements of vegetable and other horticultural crops.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. JOHNSON.

51. (I) PLANT NUTRITION.—A critical study of the water and nutrient requirement of vegetable plants as applied to irrigation, soils and their preparation, manures, fertilizers, lime, green manures and crop residues.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. TUTTLE.

52. (II) PLANT CULTURE.—A study of certain environmental factors which influence the culture of vegetables as applied to actual commercial practices.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. JOHNSON.

73. (I) VEGETABLE MARKETING PRACTICES.—A consideration of the various factors, techniques, and methods in harvesting and preparing vegetables for market, including marketing centers, production areas, market and consumer preference, packing house facilities equipment, and premarket storage. Trips to nearby growers and markets will be required at a cost of not over ten dollars.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

Prerequisite, Agricultural Economics 55.

74. (II) MERCHANDISING OF PERISHABLES.—Discussion and demonstrations in this course will include the various techniques, practices, and methods that are used in selling and distributing horticultural commodities through both wholesale and retail outlets from the farm to the ultimate consumer. Trips to the Boston and New York markets may be elected by the student at a reasonable cost.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

75. (I) SYSTEMATIC OLERICULTURE.—A detailed study of variety identification; nomenclature and classification; history, variety improvement and seed sources; judging and exhibiting.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Hours by arrangement.

Mr. SNYDER.

76. (II) GREENHOUSE CROPS AND PLANT GROWING (1952-53).—A study of the culture of greenhouse crops including cucumbers, tomatoes, lettuce, rhubarb, and mushrooms; the growing of seeding plants both under glass and in the open for local retail or wholesale business.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. JOHNSON.

78. (II) COMMERCIAL OLERICULTURE.—A study of the problems in the commercial production of vegetables: general culture, fertilizers and manures, machinery, labor, harvesting, and marketing. One or two trips to important markets and truck growing sections are required. Twenty-five dollars will cover the cost of these trips.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. TUTTLE.

81. (I) 82. (II) SEMINAR.—Advanced study of problems relating to vegetable production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

PHILOSOPHY.

Professor GLICK, Assistant Professor SHUTE.

61. (I) INTRODUCTION TO PHILOSOPHY.—A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas.

3 class hours.

Credit, 3.

Mr. GLICK.

62. (II) HISTORY OF PHILOSOPHY.—A survey of the development of western thought from the early Greeks to the present.

3 class hours.

Credit, 3.

Mr. GLICK.

63. (I) LOGIC.—A study of the principles, problems and methods of critical thinking; emphasis upon principles and methods of formal logic; critical study of inductive reasoning and scientific method with applications to current problems.

3 class hours.

Credit, 3.

Mr. GLICK.

64. (II) ETHICS.—The meaning of good and evil, right and wrong; survey of ethical theories and practices both historical and contemporary; an attempt to evaluate these theories with reference to modern ethical problems.

3 class hours.

Credit, 3.

Mr. GLICK.

81. (I) PHILOSOPHY OF RELIGION.—A survey of the contrasting types of religious philosophy in the contemporary western world and Asia, with a critical and constructive study of basic issues, such as the meaning

of knowledge in the field of religion, the nature of faith, and the religious interpretation of reality.

3 class hours.

Credit, 3.
Mr. SHUTE.

82. (II) AESTHETICS.—A study of the leading modern theories of the nature of art, the analysis of aesthetic experience, the distinctive function of art in culture and personality, and the principles of criticism.

3 class hours.

Credit, 3.
Mr. SHUTE.

83. (I) READINGS IN ANCIENT PHILOSOPHY.—Selections are read from Plato's dialogues and from the works of Aristotle. A study is made of the leading philosophical issues discussed by these writers, with emphasis on ideas which became basic in the development of western thought.

3 class hours.

Credit, 3.
Mr. SHUTE.

84 (II) READINGS IN MODERN PHILOSOPHY.—Selections are read from Locke, Hume, Kant, and Whitehead, to display the leading ways in which modern thinkers have looked upon the nature of the universe and the possibilities and limitations of knowledge.

3 class hours.

Credit, 3.
Mr. SHUTE.

85. (I) METAPHYSICS.—The field of metaphysics defined in distinction from the field of science, contrasting theories of reality offered by contemporary naturalism and idealism, especially in the light of recent developments in biological and physical science; analysis of basic ideas which will enable the student to continue a fruitful development of his own philosophy.

3 class hours.

Credit, 3.
Mr. SHUTE.

86. (II) THEORY OF KNOWLEDGE.—Types of knowledge and correlated methods of knowing; questions of certainty, probability, and limits of knowledge; ways of expression, such as mathematical formulae, language, and art, and their involvement in the knowing process; the nature of the relation between the knowing subject and the known object.

3 class hours.

Credit, 3.
Mr. SHUTE.

PHYSICAL EDUCATION FOR MEN.

Professor MCGUIRK, Professor GORE, Professor ECK, Professor LORDEN, Associate Professor KAUFFMAN, Assistant Professor DERBY, Assistant Professor BRIGGS, Assistant Professor ROGERS, Mr. BALL, Mr. SALWAK, Mr. KOSAKOWSKI, Mr. MASI, Mr. RICCI.

3. (I) 4. (II) PHYSICAL FITNESS ACTIVITY COURSE.—The object of the course is to help every student, through regularity and continuity

of physical activity, to realize not only his physical and mental capacities, but learn to use them as an intelligent, cooperative, and efficient citizen. The students are given physical fitness ratings, must meet minimum standards in the basic skills in team sports and rugged exercise, as well as learn to swim.

3 class hours.

Credit, 1.

THE DEPARTMENT.

5. (I) PHYSICAL EDUCATION SURVEY.—A survey of the health, physical education, and physical recreation courses which make up the physical education major. This course provides an introduction to the broad field of physical education.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. GORE, Mr. ROGERS, Mr. SALWAK and the DEPARTMENT.

33. (I) 34. (II) PHYSICAL EDUCATION.—A physical fitness activity program.

3 hours.

Credit, 1.

THE DEPARTMENT.

63. (I) 64. (II) PHYSICAL EDUCATION.—A physical fitness activity program. This course continues with the rugged physical fitness activity with additional emphasis upon the so-called carry-over-value and recreational sports.

3 hours.

Credit, 1.

THE DEPARTMENT.

83. (I) 84. (II) PHYSICAL EDUCATION.—A physical fitness activity program. This course continues with the rugged physical fitness activity with additional emphasis upon the so-called carry-over-value and recreational sports.

3 hours.

Credit, 1.

THE DEPARTMENT.

22. (II) FIRST AID INSTRUCTOR COURSE.—This course includes training in the standard, advanced, and instructor First Aid courses. Successful completion results in certification as American National Red Cross First Aid instructor. Some work is given in athletic training techniques.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. GORE.

41. (I) WINTER ACTIVITIES.—Winter ice and snow activities programs, including skiing, skating, conduct of winter carnivals, winter sports safety; and the design, construction, and maintenance of winter sports facilities.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

9:00-9:50 Th.; laboratory hours by arrangement.

Mr. GORE, Mr. BRIGGS.

42. (II) WATER SAFETY INSTRUCTOR COURSE.—This course includes training in senior lifesaving and the instructor Water Safety course. Successful completion results in certification as American National Red Cross Water Safety instructor. Some work is given in competitive swimming, diving, canoeing, boating and recreational swimming.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

12:00-12:50 Tu.; 1:00-2:50 Tu. Th.

Mr. GORE, Mr. ROGERS.

43. (I) OFFICIATING.—Technique and practice in officiating major sports.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

11:00-11:50 F.; laboratory hours by arrangement.

Mr. BALL.

44. (II) TESTS AND MEASUREMENTS.—This course considers the status of measurement in physical education, an historical sketch, typical contributions in anthropometrics, strength tests, ability and achievement tests, cardiac functional tests, neuro-muscular control tests, and sport technique tests; and it includes the tools of measurement, indices, and the theory and practice of test administration.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. SALWAK.

45. (I) HISTORY AND PURPOSES OF PHYSICAL EDUCATION.—A brief study of the history of the development of the various systems of physical education and a study of the aims and ideals of present-day physical education.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

Mr. LORDEN.

51. (I) INTRODUCTORY COURSE FOR TEACHER-COACHES.—This course outlines the coaching of soccer, basketball, and hockey.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W.

Mr. BRIGGS, Mr. BALL.

52. (II) INTRODUCTORY COURSE FOR TEACHER-COACHES.—Continuation of Course 51. This course outlines the coaching of football, baseball, and track and field.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W.

Mr. ECK, Mr. LORDEN, Mr. MASI, Mr. DERBY.

53. (I) PHYSICAL EDUCATION—ELEMENTARY SCHOOLS.—This course includes the objectives, organization, significance, and content of physical education in the grade schools. The course is correlated with the requirements of the State Department of Education.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; 1:00-2:50 M.

Mr. DERBY.

54. (II) PHYSICAL EDUCATION—SPECIAL METHODS.—This course includes the objectives, significance, organization and content of physical education in junior and senior high school. The course is correlated with the requirements of the State Department of Education.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

11:00-11:50 Tu.. Th.; 1:00-2:50 M.

Mr. KAUFFMAN.

55. (I) ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Problems and procedures in physical education, organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas.

3 class hours.

Credit, 3.

12:00-12:50 M. W. F.

Mr. McGUIRK.

57. (I) CAMP COUNSELOR TRAINING COURSE.—This course covers details of camping techniques from the three-fold angle of organized camp counselor, i.e., as a child counselor, as a general activities counselor, and as a specialty counselor.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. GORE.

58. (II) ORGANIZED CAMPING ADMINISTRATION.—This course includes the history of organized camping, minimum standards of health and safety, the development of camping philosophies, trends, and the camping industry.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. GORE.

59. (I) SCOUTING ELEMENTS AND PRINCIPLES.—A course in the elements and principles of scouting, given in cooperation with the Scout Executive, Hampshire-Franklin Council, Boy Scouts of America.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Hours by arrangement.

Mr. GORE.

71. (I) 72. (II) SPECIAL PROBLEMS COURSES.—Presentation and discussion of research work in physical education, physical recreation, health and safety education, or athletics.

3 class hours.

Credit, 3.

Hours by arrangement.

Mr. GORE and the DEPARTMENT.

73. (I) RECREATION—ADMINISTRATION AND ORGANIZATION.—Administration and organization of recreational areas, including playground layouts, equipment supplies, maintenance, leadership, training activities, conduct of programs, and problems of operations.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. GORE.

74. (II) RECREATION—RECREATION LAND USE.—Including types of recreational areas, recreational resources, recreational needs of the people, geography of recreation, competitors of recreational land use, economic aspects of federal, state, and local recreational systems.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. GORE.

76. (II) ANATOMY GENERAL.—A course in structural human anatomy.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. RICCI.

78. (II) ANATOMY APPLIED—KINESIOLOGY.—A course aimed to give the anatomical application basal to a thorough understanding of the mechanical problems in apparatus, athletic, and corrective exercises.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. KAUFFMAN.

Prerequisite, Physical Education 76.

86. (II) SAFETY EDUCATION.—This course includes safety education, driver education and driver training at the instructor's level. Successful completion results in certification as American National Red Cross Accident Prevention instructor and Massachusetts Registry of Motor Vehicles instructor in Driver Education and Driver Training. The course is designed primarily for seniors majoring in physical education and for elementary and secondary school teachers.

2 class hours.

12:00-12:50 M. W.

Credit, 2.
Mr. GORE, Mr. MASI.

89. (I) PREVENTION AND CARE OF ATHLETIC INJURIES.—The prevention and correction of accidents in athletic activities. Use of proper personal and field equipment, support methods, conditioning exercises, the medical examination, and therapeutic aids. The clinical use of physiotherapy equipment, massage, and advanced training methods.

2 class hours.

Credit, 2.
Mr. RICCI.

PHYSICAL EDUCATION FOR WOMEN

Associate Professor TOTMAN, Miss HUBBARD, Miss HIRSCHHAUT,
Mrs. HIBBARD.

7. (I) 8. (II) PHYSICAL EDUCATION.—Students are required to participate in one term of dancing, in one team sport, and to pass a safety test in swimming. Except for these requirements, all unrestricted students may select any activity which is offered. Fall season: field hockey, volleyball, soccer, archery, tennis, swimming. Winter season: basketball, volleyball, badminton, swimming, life saving (by permission), modern dance, square dance, calisthenics, posture training. Spring season: softball, soccer, archery, swimming, modern dance.

3 class hours.

Credit, 2.
THE DEPARTMENT.

27. (I) 28. (II) PHYSICAL EDUCATION.—The activities offered in Courses 7 and 8 are continued. In addition, advanced modern dance is offered in the fall season and water safety instruction in the winter season. Unrestricted students may select any activity which is offered.

3 class hours.

Credit, 2.

THE DEPARTMENT.

61. (I) 62. (II) PHYSICAL EDUCATION.—Participation in the activity classes for freshmen and sophomores, with the purpose of gaining further skill and developing physical fitness.

3 class hours.

Credit, 1.

THE DEPARTMENT.

81. (I) 82. (II) PHYSICAL EDUCATION.—Participation in activity courses for physical fitness with opportunity to learn refereeing in sports and to assist in teaching individual sports.

3 class hours.

Credit, 1.

THE DEPARTMENT.

PHYSICS

Professor POWERS, Professor ALDERMAN, Associate Professor ROSS,
Assistant Professor BURPO,* Assistant Professor WANNLUND,
Assistant Professor MATHIESON, Mr. CROOKER.

25. (I) MECHANICS, SOUND, AND HEAT.—This course is largely a study of the following and related topics; equilibrium of bodies; forms of energy and work; motion, fluids; surface tension; molecular phenomena; elasticity; wave-motion; sound; thermometry expansion; hygrometry; transmission of heat; changes of state; radiation.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 8 or its equivalent.

26. (II) LIGHT AND ELECTRICITY.—Includes wave-theory of light; optical instruments; analysis of light; interference; polarization; magnetism; electrostatics; production and properties of electric currents; electrical appliances and machines; oscillatory circuits; vacuum tubes, and related topics.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Physics 25.

51. (I) 52. (II) MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS. — Course 51 deals with direct currents; Course 52 with alternating currents, applications of thermionics, and photo-electricity. These courses are planned to give the student a good training in theory and methods of measurement in the indicated

* On leave of absence for military service.

subjects, which are useful in many fields of investigation. Modern methods are stressed and instruments of precision are used.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu., Th.; 10:00-11:50 Tu. or 1:00-2:50 Tu. or W.

Mr. POWERS.

Prerequisites, Physics 26 and Mathematics 29 for Course 51; Physics 51 for Course 52.

55. (I) 56. (II) MECHANICS.—Development of the fundamental concepts of dynamics with applications to particles and rigid bodies in translation and rotation. One laboratory period may be substituted for one class hour.

3 class hours.

Credit, 3.

9:00-9:50 Tu., Th.; laboratory by arrangement.

Mr. ROSS.

Prerequisites, Physics 26; Mathematics 30.

58. (II) PHOTOGRAPHY.—Class work and laboratory practice in the fundamentals of photography. Types of cameras, characteristics of photographic emulsions, exposure and exposure meters, processing of negative and prints, enlarging, composition. Limited to ten students.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

3:00-3:50 W.; 1:00-3:50 M. F.

Mr. POWERS.

Prerequisites, Physics 25, 26; Chemistry 1, 2.

60. (II) SOUND AND ACOUSTICS.—A study of vibrations, vibrating bodies, coupled systems, sound structure, and acoustic properties. The work will include many applications of sound to technical and commercial fields.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

Prerequisite, Physics 55 or its equivalent.

61. (I) 62. HEAT AND THERMODYNAMICS.—A study of heat exchanges and energy changes due to heat in systems of matter. The subject material and experimental methods are useful in other branches of science.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu., Th.; 2:00-3:50 Th.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

63. (I) 64. (II) OPTICS.—An intermediate course in the theory of light. Work in geometrical and physical optics is done. Precision instruments are used in the laboratory.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu., Th.; laboratory hours by arrangement.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

75. (I) 76. (II) ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.—These courses are largely experimental and the subject matter is adapted to the needs of the individual student. The research viewpoint

is emphasized. The class hour is used for a course in precision of measurements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WANNLUND.

Prerequisites, Mathematics 29, 30; two of the following year courses: Physics 51-52, 55-56, 61-62, 63-64.

85. (I) 86. (II) MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. ROSS.

Prerequisites, Physics 52, 62 and 64 or equivalent; Mathematics 30.

95. (I) 96. (II) ELECTRONICS.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. POWERS, Mr. WANNLUND.

Prerequisites, Physics 51, 52; Mathematics 29, 30.

POMOLOGY

Professor FRENCH, Associate Professor ROBERTS, Assistant Professor
O. G. ANDERSON, Mr. J. F. ANDERSON.

26. (II) SMALL FRUITS.—A study of the growing of raspberries, blackberries, strawberries, currants, blueberries, cranberries, and grapes, dealing with such questions as varieties, selecting a site for the plantation, soils, fertilizers, pruning, harvesting, and marketing.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W. or F.

Mr. O. ANDERSON.

53. (I) GENERAL POMOLOGY.—A study of the most improved practices in tree fruit production, including orchard sites and soils, laying out and setting the orchard, the structure and growth of fruit plants; the bearing habits, pruning, fertilizers, pollination; pest control; harvesting and marketing the crop.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu., Th.; 3:00-4:50 Th. or F.

Mr. ROBERTS, Mr. J. ANDERSON.

56. (II) SPRAYING.—This course is especially designed to familiarize the student with details of pest control in the orchard. It involves a study of (a) spraying and dusting machinery; (b) methods in the application of materials used in orchards, with the important considerations for spraying each fruit and for combating each orchard pest; (c) preparation for use of the common fungicides and insecticides.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu., Th.; 1:00-2:50 Tu.

Mr. O. ANDERSON.

57. (I) **FRUIT JUDGING.**—Practice in the identification, selection, and judging of fruit for exhibition purposes. From this class a team is selected to represent the University in Intercollegiate Fruit Judging Contests.

1 class hour.

Credit, 1.

Hours by arrangement.

Mr. O. ANDERSON.

75. (I) **SYSTEMATIC POMOLOGY (1952-53).**—A study of the more important kinds and varieties of fruits grown in the United States, their relationships and nomenclature. Particular emphasis is placed upon the identification, classification and value of varieties including a study of the characters of the plant as well as the fruit. Given in alternate years.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.

8:00-8:50 Tu.; 1:00-2:50 M. Tu. F.

Mr. O. ANDERSON.

77. (I) **COMMERCIAL POMOLOGY (1951-52).**—A critical consideration of the picking, grading, packing, storing, and marketing of fruits. This course also considers the leading American and foreign centers of fruit production as they affect our own fruit industry through competition here or abroad. A two-day market trip will be required at an approximate cost of ten dollars. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 1:00-2:50 Tu.

Mr. ROBERTS.

81. (I) 82. (II) **ADVANCED POMOLOGY.**—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants. Special attention is given to the more important research work in the field of pomology.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. FRENCH.

Prerequisite, Pomology 53.

83. (I) 84. (II) **SEMINAR.**—Advanced study of problems relating to fruit production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

85. (I) 86. (II) **CRANBERRY PROBLEMS.**—For seniors specializing in cranberry technology. Selected readings and individual work to familiarize students with the literature, research, and problems of the cranberry industry.

Credit, 2.

Hours by arrangement.

Mr. FRENCH.

Plant Breeding

52. (II) **PLANT BREEDING METHODS.**—An advanced study of genetic topics peculiar to plants, also the methods and problems of the plant breeder. Laboratory work in genetic analysis and the breeding of plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. F.; 3:00-4:50 W.

Mr. FRENCH.

Prerequisite, Zoology 53.

81. (I) 82. (II) SPECIAL PROBLEMS IN PLANT BREEDING.—Qualified seniors may carry on advanced study on special topics or undertake such original investigations as time and available material will permit.

Hours by arrangement.

Credit, 2.

Mr. FRENCH.

Prerequisite, Plant Breeding 52.

POULTRY HUSBANDRY

Professor JEFFREY, Professor SANCTUARY, Assistant Professor BANTA,
Assistant Professor VONDELL.

25. (I) GENERAL POULTRY.—For students not majoring in poultry husbandry. A general course giving an introduction to the breeds of poultry, the principles and practice of breeding, incubation, and poultry nutrition, brooding and rearing, houses and equipment, management practices, marketing poultry products, and the business of poultry keeping.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 10:00-11:50 or 1:00-2:50 or 3:00-4:50 Tu.

Mr. JEFFREY.

52. (II) INCUBATION AND BROODING.—This course is based upon the actual operation of incubators and brooders. Each year a research project is planned and data obtained concerning the effects of various incubator adjustments upon malpositions and maldevelopment of embryos and the percentage of hatch. Studies of temperature gradients, chick behavior and development are made in brooding with various types of equipment. Analysis is made of common and unusual field problems.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Tu.; 3:00-4:50 Th.; other hours by arrangement.

Mr. SANCTUARY.

53. (I) POULTRY JUDGING.—Physiological and anatomical characters are used in production judging. The American Standard of Perfection is employed in a study of the more popular breeds and varieties, and for exhibition judging. Judging teams competing in the Eastern Intercollegiate Contest are trained in this course.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Tu.; 1:00-2:50 W. F.

Mr. BANTA.

55. (I) POULTRY HOUSING AND SANITATION.—In this course are considered the biological factors related to the proper physical environment necessary for growth, health, and reproduction. Various systems of ventilation and methods of insulation are studied and demonstrated by models. Humidity, temperature, and condensation studies are made at the poultry plant with varying adjustments of ventilation devices. A study is made of modern equipment. Sanitation from the standpoint of disease prevention practices is also considered.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

11:00-11:50 Tu.; 3:00-4:50 Th.

Mr. SANCTUARY.

56. (II) **POULTRY NUTRITION.**—A study of the scientific principles of nutrition, classification and identification of feedstuffs, formulation and calculation of rations for specific purposes. A class trip may be arranged. 2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th.; 1:00-2:50 W. Mr. BANTA.

75. (I) **MARKETING POULTRY PRODUCTS.**—A study of the preparation and grading methods of eggs and poultry products to meet the requirements of the northeastern markets. The laboratories are designed to cover the fields of modern dressing, processing and packaging of poultry; as well as grading, candling and quality studies of eggs. A one-half day class trip to Springfield markets in December is required. Estimated cost, two dollars.

1 class hour; 1 2-hour laboratory period. Credit, 2.
10:00-10:50 Tu.; 3:00-4:50 W. Mr. VONDELL.

76. (II) **TURKEY PRODUCTION.**—This course includes the production of ducks and geese but most of the time is given to the turkey industry; its importance, breeds, breeding, incubation, brooding, feeding, finishing, marketing, etc.

1 class hour; 1 2-hour laboratory period. Credit, 2.
1:00-1:50 M.; 1:00-2:50 W. Mr. VONDELL.

77. (I) **POULTRY BREEDING.**—The improvement of poultry by selection is developed through a study of the principles of heredity. The inheritance of morphological and physiological characters including plumage color, egg production, meat production, hatchability, egg traits, and disease resistance.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. W.; 3:00-4:50 F. Mr. JEFFREY.
Prerequisite, Zoology 1, 53.

78. (II) **SEMINAR AND FARM MANAGEMENT.**—A combination seminar and lecture course designed to give the student a comprehensive view of all phases of the poultry industry. A field trip covering approximately three days will be arranged. Poultry majors with an average of 80 or more in poultry courses may elect an additional problem credit.

3 class hours; 1 2-hour laboratory period may be elected. Credits, 3, 4.
11:00-11:50 M. W. F. Mr. JEFFREY.

PSYCHOLOGY

Professor NEET, Assistant Professor FELDMAN, Assistant Professor Goss, Assistant Professor VALLANCE, Assistant Professor MATTHEWS, Mr. SAUNDERS, Mr. SPECTOR, Mr. FIELD, Dr. MICHAELSON.

26. (I) and (II) **GENERAL PSYCHOLOGY.**—This is an introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Topics considered include the nature and development of behavior, motivation, learning, problems of adjustment, intelligence, aptitudes, and personality.

3 class hours. Credit, 3.
THE DEPARTMENT.

28. (II) GENERAL PSYCHOLOGY.—A continuation of Psychology 26. Topics considered include neural relationships, sensory processes, perception, thinking, emotions, social behavior, and individual differences.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

THE DEPARTMENT.

Prerequisite, Psychology 26.

51. (I) EXPERIMENTAL PSYCHOLOGY.—This course is designed to give an understanding of the problems, methods, and data of experimental psychology. One of the basic functions of the course is to acquaint the student with the scientific method as applied to psychological studies of behavior.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu. Th.; 1:00-2:50 Tu. W. or Th.

Mr. NEET.

Prerequisite, Psychology 26.

56. (II) EDUCATIONAL PSYCHOLOGY.—A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are: physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. VALLANCE.

Prerequisite, Psychology 26.

61. (I) SOCIAL PSYCHOLOGY.—The social behavior of the individual. Topics considered will include methods of studying social behavior, schools of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, custom and conformity.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. VALLANCE.

Prerequisite, Psychology 26.

62. (II) SOCIAL PSYCHOLOGY (1951-52).—A survey of multi-individual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion, behavior in crowd situations, social conflict and prejudice. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. VALLANCE.

Prerequisite, Psychology 26.

63. (I) PHYSIOLOGICAL PSYCHOLOGY.—A study of the relationships between physiological processes and behavior. Major emphasis will be placed upon the structure and mechanisms of the central nervous system and sense organs, endocrine functions, and drives.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. FELDMAN.

Prerequisites, Psychology 26; Zoology 35.

72. (II) **ADVANCED EXPERIMENTAL PSYCHOLOGY.**—The literature, techniques, and apparatus of experimental psychology are considered, and selected projects are carried out individually by the members of the class.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Th.; 1:00-2:50 Tu. Th.

Mr. NEET.

Prerequisite, Psychology 51.

75. (I) **STATISTICS IN PSYCHOLOGY.**—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

2:00-2:50 M. F.; 3:00 4:50 W.

Mr. Goss.

Prerequisites, Psychology 26; Agricultural Economics 79 or Mathematics 62.

81. (I) 82. (II) **PSYCHOLOGICAL TESTS.**—Different varieties of psychological tests are studied. The first semester considers group tests of intelligence, aptitude, interest, personality, and clinical tests. The second semester is devoted to a consideration of individual and performance tests of intelligence and to the nature and theories of intelligence. Practice will be given in administering, scoring, interpreting, and evaluating tests. Either semester may be elected independently.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 F.; 1:00-2:50 M. W. or 3:00-4:50 Tu. Th.

Mr. SAUNDERS.

Prerequisite, Psychology 26.

83. (I) **ABNORMAL PSYCHOLOGY.**—A study of the principles relative to the causes, symptoms, and treatment of behavior abnormalities. Special attention is given to the following: dynamics of behavior abnormalities, speech problems, emotional extremes, memory losses and other disorders of association, the neuroses and psychoses, and mental deficiency. Hospital trips and clinics.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. NEET.

Prerequisite, Psychology 26.

86. (II) **INDUSTRIAL PSYCHOLOGY.**—The course aims to give understanding of psychological principles and methods in business and industrial situations. Topics considered include: employee selection and training, motivation and morale, design of machines and equipment, working conditions, fatigue, accident prevention, and advertising and selling.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. SPECTOR.

Prerequisite, Psychology 26.

88. (II) **PSYCHOLOGY OF GUIDANCE.**—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 3:00-4:50 M. or W.

Mr. FIELD.

Prerequisite, Psychology 26 and 81 or consent of the instructor.

90. (II) CONTEMPORARY PSYCHOLOGIES.—A logical, historical, and systematic analysis of contemporary psychological theories, including structuralism, functionalism, Gestalt and organismic psychologies, psychoanalysis, and behaviorisms from Thorndike and Watson to the contemporary scene.

3 class hours.

2:00-2:50 M. W. F.

Prerequisite, Psychology 26.

Credit, 3.
Mr. Goss.

92. (II) CLINICAL PSYCHOLOGY.—A study of the techniques and methods involved in the diagnosis and treatment of behavior disorders. Diagnostic clinical testing, counselling, and other psychotherapeutic procedures are given consideration. Hospital trips and clinics.

3 class hours..

11:00-11:50 M. W. F.

Prerequisite, Psychology 83 or consent of the instructor.

Mr. SAUNDERS, Dr. MICHELSON.

Credit, 3.

93. (I) PSYCHOLOGY OF ADOLESCENCE (1952-53).—A consideration of the development, and emotional, social, and intellectual adjustment of the individual during the adolescent years. Given in alternate years.

3 class hours..

9:00-9:50 Tu. Th. S.

Prerequisite, Psychology 26.

Credit, 3.
Mr. Goss.

94. (II) CHILD PSYCHOLOGY.—This course aims to develop an understanding of the behavior and characteristics of the child. Psychological aspects of the following topics are considered: original nature, maturation and development of behavior, language, habit formation, emotional behavior, development of intelligence and understanding, social behavior, motivation, personality, and mental hygiene. Nursery school observation and practice.

3 class hours.

10:00-10:50 M. W. F.

Prerequisite Psychology, 26

Credit, 3.
Mr. NEET.

95. (I) 96. (II) PROBLEMS IN PSYCHOLOGY.—For qualified seniors. The student will be allowed to do independent work and study on special problems or in certain fields of psychological interest. By arrangement with the members of the department.

Credit, 1.
THE DEPARTMENT.

ROMANCE LANGUAGES

Professor FRAKER, Professor GODING, Assistant Professor CLARKE,
Assistant Professor FERRIGNO, Assistant Professor JOHNSON,
Mr. CESTRE, Mr. WEXLER,, MISS TILLONA, Mr. GREENFIELD

French

1. (I) 2. (II) ELEMENTARY FRENCH.—For those who have had no previous French or whose preparation is insufficient for more advanced courses. Intensive drill for rapid reading, writing, speaking and under-

standing. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

4 class hours.

Credit, 3.

THE DEPARTMENT.

3. (I) 4. (II) *INTERMEDIATE FRENCH*.—Primarily a reading course with stress on both exact translation and rapid reading for comprehension. Grammar review and oral practice. Recommended for those who want only a reading knowledge of French.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 1 and 2, or 2 years of high school French.

5. (I) 6. (II) *ADVANCED INTERMEDIATE FRENCH*.—Readings from representative masterpieces of French literature. Composition, grammar review, intensive oral practice.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 3 and 4, or 2 years of high school French, or permission of the Department.

9. (I) 10. (II) *ORAL PRACTICE*.—Not open to freshmen except in conjunction with another course in French. Intensive oral practice, vocabulary study, grammar essentials for fluent speech. Recommended for those who desire a reasonably good command of the spoken language.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 3 and 4 or equivalent or permission of the instructor.

15. (I) 16. (II) *SURVEY OF FRENCH LITERATURE*.—Readings from representative masterpieces of French literature. Review of grammar. Composition, outside reading. Conducted in French except for one section conducted in English.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 5 and 6 or 3 years of high school French.

Advanced Courses

Prerequisites, French 15 and 16, or French 5 and 6 and permission of the instructor. Since most of the advanced courses are conducted in French, the student should have a reasonable oral command of the language before electing these courses. For this purpose the student is advised to take French 9 and 10, or spend one year in the French House.

29. (I) 30. (II) *FRENCH LITERATURE OF THE SEVENTEENTH CENTURY (1951-52)*.—A survey of the Classic period, with readings from representative works. Given in alternate years.

3 class hours.

Credit, 3.

MR. FRAKER.

31. (I) 32. (II) FRENCH LITERATURE OF THE NINETEENTH CENTURY (1952-53).—A detailed study of the more important authors and movements. Given in alternate years.

3 class hours.

Credit, 3.
Mr. GODING.

51. (I) FRENCH LITERATURE OF THE EIGHTEENTH CENTURY (1952-53).—Rousseau: The Encyclopedists. Given in alternate years.

3 class hours.

Credit, 3.
Mr. FRAKER.

52. (II) VOLTAIRE (1952-53).—A study of the Eighteenth Century through the life and works of Voltaire. Given in alternate years.

3 class hours..

Credit, 3.
Mr. FRAKER.

53. (I) 54. (II) FRENCH LITERATURE OF THE TWENTIETH CENTURY.

3 class hours.

Credit, 3.
Miss CLARKE.

75. (I) 76. (II) COURSE DE STYLE.—A study of syntax and idioms at an advanced level. The student is taught how to express himself clearly and logically in living French.

4 class hours.

Credit, 3.
Mr. CESTRE.

79. (I) FRENCH CIVILIZATION.—A study of those elements which lie back of the cultural contribution of France to the world civilization. Subjects studied will include arts, sciences, school systems, the press, the family, social classes, influences of history and geography. The assigned readings will be drawn from contemporary French Literature.

4 class hours.

Credit, 3.
Mr. GODING.

80. (II) TEACHER TRAINING COURSE.—Practice teaching, methods, outside readings, observations, reports.

4 class hours.

Credit, 3.
Mr. GODING.

82. (II) ADVANCED GRAMMAR AND COMPOSITION.—Phonetics. Recommended for majors who intend to teach French.

4 class hours.

Credit, 3.
Mr. GODING.

Italian

51. (I) 52. (II) ELEMENTARY ITALIAN.—An introductory course for those who have had no previous Italian or whose preparation is insufficient for more advanced work. Training in grammar, composition, pronunciation, with special emphasis on reading.

4 class hours.

Credit, 3.
Mr. FERRIGNO.

75. (I) 76. (II) *INTERMEDIATE ITALIAN*.—Primarily a reading course with considerable attention to review of grammar, and speech.
4 class hours.

Credit, 3.
Mr. FERRIGNO.

Spanish

1. (I) 2. (II) *ELEMENTARY SPANISH*.—Grammar, exercises in composition and conversation, reading of selected short stories. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.
3 class hours; 4th hour optional.

Credit, 3.
Mr. FRAKER, Mr. FERRIGNO.

7. (I) 8. (II) *INTERMEDIATE SPANISH*.—Readings from modern authors; grammar review.
3 class hours; 4th hour optional.

Credit, 3.
Mr. FERRIGNO.

Prerequisites, Spanish 1 and 2 or three years of high school Spanish.

29. (I) *THE ROMANTIC PERIOD (1952-53)*.—Readings from representative authors; written and oral composition. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. FRAKER.

Prerequisites, Spanish 7 and 8.

30. (II) *THE MODERNISTS (1952-53)*.—Dario, Nervo and their contemporaries; composition and conversation. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. FRAKER.

Prerequisite, Spanish 29.

73. (I) 74. (II) *THE GOLDEN AGE (1951-52)*. Readings from Cervantes, Lope de Vega, Calderon, Garcilaso and others. Composition and conversation. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. FRAKER.

Prerequisites, Spanish 7 and 8.

Russian

51. (I) 52. (II) *ELEMENTARY RUSSIAN*.—Grammar, exercises in composition and conversation, selected readings. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.
4 class hours.

Credit, 3.
Mr. GABRYS.

Prerequisite, previous language training.

SOCIOLOGY

Professor KORSON, Mr. DRIVER, Mr. MANFREDI, Mr. LINDSTROM

28. (I) and (II) *INTRODUCTION TO SOCIOLOGY*.—an outline of the social order, and of the individual considered as a member of his various groups.
3 class hours.

Credit, 3.
THE DEPARTMENT.

51. (I) URBAN SOCIOLOGY.—A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Characteristics of the population, urban ecology, and problems of adjustment in the fields of housing, health, education, and recreation.

3 class hours.

Credit, 3.

2:00-2:50 Tu. Th., third hour by arrangement.

Mr. MANFREDI.

Prerequisite, Sociology 28.

52. (II) RURAL SOCIOLOGY.—A study of rural society from the standpoint of its population, institutions, standards of living, and their relation to urban society.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

53. (I) AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.—A non-technical sociological study of man in pre-literate societies.

3 class hours.

Credit, 3.

Mr. LINDSTROM.

Prerequisite, Sociology 28.

54. (II) AMERICAN RACE RELATIONS.—The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. A rabbi, minister, and priest are invited to address the class, and visits are made to the respective churches.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

57. (I) THE FAMILY.—The history and development of the customs of courtship and marriage from primitive society to the American family. The basic causes of changes and trends of the family are considered. The folkways and mores of marriage in other contemporary societies are also studied.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

61. (I) POPULATION PROBLEMS.—An analytical study of population trends and problems of the world; the origin, composition, growth, migration, and urbanization of the American population. A consideration of population pressure as a cause of migratory movements.

3 class hours.

Credit, 3.

Mr. LINDSTROM.

Prerequisite, Sociology 28.

75. (I) SOCIAL PROBLEMS.—A study of abuses affecting the home, recreation, business, industry, family, welfare, public health, government, mental disease, and crime. The charitable and correctional institutions of

Massachusetts as agencies of reform. Visits to Belchertown State Schools, Northampton State Hospital and Northampton Superior Court are arranged, and specialists in their fields will be invited as speakers.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. DRIVER.

Prerequisite, Sociology 28.

76. (II) INTRODUCTION TO SOCIAL WELFARE.—For senior majors and others who qualify. Contemporary problems of social concern: causes of poverty; methods of caring for adult and child dependents and defectives. A consideration of public and private agency administration and techniques, and an examination of federal, state, and local community programs.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisites, Sociology 28, 75.

78. (II) CRIMINOLOGY.—A study of the nature of crimes and the factors underlying criminal behavior. Attention is also given to the machinery of justice in criminal behavior: the law, the courts, police enforcement, penal and correctional institutions.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisite, Sociology 75.

79. (I) 80. (II) SEMINAR.—Admission by permission of instructor. A study of the methods of research employed by sociologists. Students, under direction of the instructor, analyze and organize such sociological material as they gather through their own research. Projects must be approved in advance by the instructor.

Credit, 3.

Hours by arrangement.

Mr. DRIVER.

82. (II) SOCIOLOGICAL THEORY.—An examination of the contributions of European and American writers who have concerned themselves with theories of the origin, growth, and development of human social organization.

3 class hours.

Credit, 3.

Mr. MANFREDI.

Prerequisite, Sociology 53.

SPEECH

Associate Professor NIEDECK, Mr. ZAITZ,† Mr. STELKOVIS, Mr. PEIRCE, and the INSTRUCTORS IN ENGLISH.

3. (I) 4. (II) PUBLIC SPEAKING.—This course is designed to give the student introductory instruction and opportunity in oral self-expression and includes both public speaking and literary interpretation. Scheduled under English 1, 2.

1 class hour.

Credit, 1.

THE DEPARTMENT.

† On leave of absence

89. (I) DRAMATIC PRODUCTION.—This course offers instruction and practice in casting, directing, make-up, lighting, and scenic design and construction.

3 2-hour laboratory periods.

Credit, 3.
Mr. NIEDECK.

91. (I) (II) EXTEMPORE SPEECH.—The theory and practice of public speaking for business and professional purposes.

3 class hours.

Credit, 3.
Mr. NIEDECK, Mr. STELKOVIS.

92. (II) FORMAL DISCUSSION.—Most of the semester is devoted to formal discussion: its organization and presentation. Students are given the opportunity to lead and to participate in discussions of current problems.

3 class hours.

Credit, 3.
Mr. ZAITZ.

Prerequisite, Speech 91.

VETERINARY SCIENCE

Professor BULLIS, Associate Professor SMITH.

75. (I) COMPARATIVE VETERINARY ANATOMY.—A study of the structure of vertebrates with emphasis upon the comparative structure of domesticated animals, both mammals and birds.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.
Mr. SMITH.

76. (II) GENERAL VETERINARY PATHOLOGY.—An introduction to the study of disease—causes, transmission, structural changes, and defense mechanisms; and the application of these principles to the prevention, control, and eradication of the common communicable and non-communicable diseases of farm animals.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.
Mr. SMITH.

Prerequisite, Veterinary Science 75.

78. (II) GENERAL VETERINARY PATHOLOGY.—This course is similar to Veterinary Science 76 except that diseases of importance to wildlife, and diseases of animals transmissible to man will be considered.

3 class hours.

Credit, 3.
Mr. SMITH.

Prerequisites, Bacteriology 31, Zoology 35 or 71.

88. (II) AVIAN PATHOLOGY.—This course is similar to Veterinary Science 76 but with application to specific communicable and non-communicable diseases of poultry.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.
Mr. BULLIS.

Prerequisite, Veterinary Science 75.

ZOOLOGY

Professor WOODSIDE, Professor BISHOP,† Assistant Professor TRAVER, Assistant Professor BARTLETT, Assistant Professor ROLLASON, Assistant Professor SNEDECOR, Mr. ANDREWS,† Mr. KATSH, Mr. NUTTING, Mr. RAUCH, Mr. HONIGBERG, Mr. DEARDEN, Mr. SWENSON.

1. (I) and (II) **INTRODUCTORY ZOOLOGY**.—This course provides an introduction to the principles of biology, with special reference to the zoological aspects. The structure and activities of a representative vertebrate animal, the frog, are considered in detail and the knowledge thus gained is utilized in a comprehensive survey of the major groups of the animal kingdom. Brief introductions are given to the principles of classification, nutrition, structure and functions of protoplasm, genetics, heredity, development, and evolution.

2 class hours; 1 3-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th. or 11:00-11:50 M. W.; laboratory hours as sectioned.
THE DEPARTMENT.

25. (I) **SURVEY OF THE ANIMAL KINGDOM**.—Lectures emphasize those aspects of the zoological sciences which are least stressed in the introductory course; the principles of classification; ecology; economic importance; and the history of zoology in relation to man's progress. The laboratory work will include several exercises in field work; studies on representatives of phyla not covered previously; the morphological adaptations of animals to special modes of existence; and some simple zoological techniques.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 Tu. or W. or Th.
Mr. NUTTING.

Prerequisite, Zoology 1.

35. (I) and (II) **VERTEBRATE PHYSIOLOGY**.—An introductory course which will include consideration of circulation, respiration, digestion, metabolism, excretion, chemical and nervous coordination, muscular activity, and reproduction. The laboratory work will acquaint the student with some of the equipment and methods used in physiological studies, with emphasis on the experimental approach to the laboratory exercises.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. SNEDECOR, Mr. KATSH, Mr. SWENSON.

50. (II) **HISTOLOGY OF THE VERTEBRATES**.—A study of the types of tissues found in the body of vertebrate animals, and of the organs in which these tissues occur. Tissues and organs of mammals are emphasized. A knowledge of comparative anatomy is advised.

2 class hours, 1 3-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 2:00-4:50 Tu. or 1:00-3:50 W. Mr. ROLLASON.
Prerequisite, Zoology 1.

† On leave of absence

51. (I) and (II) **MICROTECHNIQUE OF ANIMAL TISSUES.**—The course comprises (1) a consideration of the principles and methods of microtechnique as applied to animal tissues, and (2) a series of practical exercises in the preparation of animal tissues for microscopic examination. Registration is limited to 12 students per semester. Consult instructor for section assignments.

2 2-hour laboratory periods.

Credit, 2.

Mr. HONIGBERG.

Prerequisite, Zoology 1.

53. (I) **PRINCIPLES OF GENETICS.**—Lectures and laboratory experiments concerning the laws governing the transmission of hereditary factors in plants and animals, expression and action of genes, population genetics, and the relationship of genetics to other biological sciences.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

11:00-11:50 W. F.; 1:00-4:00 M. or 2:00-5:00 F., or 9:00-12:00 Tu.

Mr. RAUCH.

Prerequisite, Zoology 1.

69. (I) **ANIMAL PARASITOLOGY.**—Important protozoan and helminthic parasites of man and domestic animals. Emphasis is placed upon morphology, physiological activities, classification and phylogeny of the parasite; life cycles, vectors, and modes of transmission; host-parasite relationships, and other fundamental principles of parasitism as a way of life.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss TRAVER.

Prerequisite, Zoology 1.

70. (II) **ADVANCED INVERTEBRATE ZOOLOGY.**—A survey of the invertebrate animals from evolutionary and phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space, are considered, as well as classification. Marine, freshwater and land faunas representative of each major group are studied.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss TRAVER.

Prerequisite, Zoology 25 or equivalent.

71. (I) **COMPARATIVE VERTEBRATE ANATOMY.**—A thorough study of the anatomy of the vertebrates, with emphasis on the evolution, special modifications, and functional interrelationships of each of the organ systems. A systemic approach in both lecture and laboratory work. Animals studied in the laboratory are: protochordates, lamprey, dogfish, mud-puppy, and cat.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 1:00-3:50 W. F. or 2:00-4:50 Tu. Th.

Mr. BARTLETT, Mr. DEARDEN.

Prerequisite, Zoology 1.

72. (II) VERTEBRATE EMBRYOLOGY.—Lectures and laboratory work dealing with the development of representative animals, special emphasis being placed on the amphibian, bird and mammal.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu, Th.; 2:00-4:50 W. F. or 2:00-4:50 Tu. Th.

Mr. WOODSIDE, Mr. RAUCH.

Prerequisite, Zoology 71.

73. (I) GENERAL CYTOLOGY.—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and laboratory work will deal with cytoplasmic structure and inclusions and nuclear phenomena.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROLLASON.

Prerequisites, Zoology 50, 51.

74. (II) LIMNOLOGY, THE STUDY OF INLAND WATERS.—In this course an opportunity is afforded to become acquainted with the plant and animal life of certain lakes, bogs, and streams in the vicinity of Amherst; with the physical and chemical factors influencing each such environment; and with the geological factors which have been responsible for the present configuration of this entire area. Five departments—geology, public health, botany, entomology, and zoology—are cooperating in the presentation of this course. Enrolment limited to sixteen. Consult Miss Traver for permission to register.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

MISS TRAVER, Mr. ALEXANDER, Mr. WILSON, Mr. HANSON, Mr. BARTLETT,

Miss SMITH, Mr. ANDREWS, Mr. SNOW, Mr. PUTALA.

Prerequisites, Botany 1, Zoology 1, Chemistry 1, 2.

80. (II) ORNITHOLOGY.—An introduction to the study of ornithology which aims to serve as a basis for further technical study or for the development of a life-time hobby. Lectures are of a general nature covering as many branches of ornithological knowledges as possible. Laboratory work includes field identification and the anatomy of the pigeon.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Th.; 3:00-4:50 M. F.

Mr. BARTLETT.

Prerequisites, Zoology 1.

81. (I) VERTEBRATE ZOOLOGY.—An introduction to the vertebrates, their classification and ecology, with particular emphasis on the fishes. Field trips for the study of local fauna will be included as a part of the laboratory exercises. Course limited to eighteen students.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 Tu. Th.

Mr. BARTLETT.

Prerequisite, Zoology 1.

82. (II) MAMMALOGY (1952-53).—The paleontology, taxonomy, speciation, natural history, range and distribution of the class Mammalia.

Primary emphasis will be placed upon the study of local fauna, including at least one week-end collecting trip as part of the laboratory exercises. Course limited to fifteen students. Given in alternate years.
2 class hours; 1 2-hour laboratory period.

Credit, 3.

MR. DEARDEN.

Prerequisites, Zoology 1 and permission of instructor.

83. (I) COMPARATIVE PHYSIOLOGY.—A course designed to familiarize students with physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla. In the laboratory the experimental method will be developed involving general procedures and individual problems.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

MR. SWENSON.

Prerequisites, Zoology 1, 35.

84. (II) GENERAL CELLULAR PHYSIOLOGY.—The properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, bioelectricity, and reproduction.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

MR. SWENSON.

Prerequisites, one year biology; organic chemistry.

85. (I) CLASSES OF ARTHROPODS OTHER THAN INSECTS.—Arthropods are studied from the phylogenetic standpoint, with special reference to their relationship to the origin and evolution of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Tu.; 1:00-2:50 Tu. Th.

MR. HANSON.

86. (II) FISHERY BIOLOGY.—Theory in the practice of regulating freshwater fisheries: the physical and biological conditions of the environment and their influence on fish populations.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

MR. NUTTING.

Prerequisite, Zoology 81 and permission of instructor.

87. (I) ENDOCRINOLOGY.—Emphasis will be directed toward the importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.) in a variety of animals.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

MR. SNEDECOR.

Prerequisite, Zoology 1.

91. (I) 92. (II) SPECIAL PROBLEMS IN ZOOLOGY.—Qualified graduate students and seniors who have met departmental requirements for specialization in the field of zoology may arrange for work on a special problem in zoology.

Credit, 3.

THE DEPARTMENT.

Invertebrate Zoology, Marine Biological Laboratory, Woods Hole, Massachusetts.

Credit, 3.

Invertebrate Embryology, Marine Biological Laboratory, Woods Hole, Massachusetts.

Credit, 3.

DEGREES CONFERRED 1951

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Allan John Bamford

Cum Laude

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Alexander Skopetz

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Anthony R. Briggs
Francis J. Brown
Roberta M. Burkhardt
Robert Ezra Canning
Arthur Oreste Castraberti
Humberto Ceballo-Padilla
Alfred B. Chaet
Diptiman Chakravarti
Murray Cooper
Henry A. Costantino
Mary Louise Coté
Louis James Creed
Anna H. Cronin
Stanley Lawrence Curtis
Robert V. Decareau
William H. Deitz
William A. Delaney
Llewellyn L. Derby
Myrtle I. Derby
Richard E. Desjarlais
James Hadley Dietz
James L. Dinsmore
Claude Elmer Douglas
Edwin E. Drewniak
Henry F. Drewniany
Ann V. Dubour
Leo J. Dymerski
Ray C. Ellis
George F. Ensworth
Walter C. Flanders
Ralph T. Florio
Thomas Walton Fox
William T. Geenty, Jr.
Charles J. Gerry
Sheldon Sumner Goldberg
Harold Gorfien

John H. Graham
Joseph Gruber
Mott P. Guhsé
Mary V. Harrington
Malcolm C. Henry
Angela D. Holmes
Roger Walter Hunt
M. Farid Husny Hussein
Adolph J. Jakobek
Hugo Jamnback
William Bradford Johnson
Frederick L. Jones
Wesley Robert Jones
Leila S. Knapp
Gaston G. Kohn
Jean L. Leclerc
Richard Henry Lee
Jean Paul Lemay
Howard S. Leopold
Samuel Liberman
Irving I. Litman
Gideon Eleazar Livingston
Edward John McGrath, Jr.
Walter B. MacGrath
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Thomas J. Mannix
James R. Marshall
Anthony J. Matuszko
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M. Keith Nadel
Edward Naroian
Nestor Nicholeris
Edward W. Pepyne
Waymand T. Peterson
Arthur James Poivan
Ernest F. Romano
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Philip Ross
David William Sanshuck
Melvin Santer
Bernard Schwab
Harold Russell Shaw
Timothy Joseph Sheehan
Allen Silbergleit
Russell E. Snow
Alfred P. Spada
William C. Squires

* As of the Class of 1950

Theodore J. Starr
 Ruth Mary Sullivan
 Elliot L. Swartz
 Ada Weaverling Tague
 Mahlon Charles Tatro
 Harry James Velandar
 Richard A. Ward
 Stanley E. Waskiewicz

Leonard H. Weinstein
 Lewis Weinstein
 Lewis Francis Wells, Jr.
 Donald Elvin Westcott
 Harold B. White
 Paul R. Wilbur
 George F. Wrightson
 Leo Zaidwerger

MASTER OF LANDSCAPE ARCHITECTURE

Chaleo Komarakul Nanagara
 Charles Henry Perin

MASTER OF ARTS

Albert Edward Goodrich, Jr.

DOCTOR OF PHILOSOPHY

Warren Averill—*Food Technology*
 Ezra Harold Bitcover—*Agronomy*
 Hsiu-fu Chao—*Entomology*
 Richard Mowry Colwell—*Economics*
 Joseph David Dalton—*Agronomy*
 Matthew E. Highlands—*Food Technology*
 Nawab Hasan Khan—*Entomology*
 Robert James Norton—*Entomology*
 Louis Frederick Ruder, Jr.—*Food Technology*
 Moses W. Vaughn—*Food Technology*

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UNIVERSITY OF MASSACHUSETTS ENROLLMENT OCTOBER 1951

UNDERGRADUATE COLLEGE

SCHOOL	1952		1953		1954		1955		Total		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
Liberal Arts	77	57	109	84	71	130	112	209	369	480	849
Science	74	29	104	38	105	54	137	82	420	203	623
Engineering	94	0	64	1	76	0	156	1	390	2	392
Business Administration ..	62	3	60	8	100	12	123	7	351	30	381
Agriculture and Horticulture	89	3	69	11	103	6	87	4	348	24	372
Home Economics	0	45	0	57	0	77	0	103	0	282	282
Division of Physical Education for Men	4	0	14	0	14	0	24	0	56	0	56
Specials									35	25	60
TOTALS	400	137	426	199	469	279	639	406	1969	1046	3015

GRADUATE SCHOOL (October 1951)

Men	Women	Total
264	29	293

STOCKBRIDGE SCHOOL (October 1951)

1952		1953		Total
Men	Women	Men	Women	
138	2	165	3	308

SUMMER SCHOOL 1951

Men	Women	Total
483	133	616

SUMMARY (October 1951)

Undergraduate College	otal 3015
Graduate School	293
Stockbridge School	308
TOTAL ENROLLMENT	3616

Office of Publications, October 1951

GIFTS AND BEQUESTS

For the information of those who may wish to make a gift or a bequest to this University, the following suggestion is made as to a suitable form which may be used.

There are a number of worth-while activities of the University which are handicapped by lack of funds and for which small endowments would make possible a greater measure of service to our students and to the Commonwealth. The religious work on the Campus is an example. This is now carried on in a very limited way by current private contributions. Further information concerning this and other activities in similar need will be gladly furnished by the President.

SUGGESTED FORM

“I give and bequeath to the Trustees of the University of Massachusetts, at Amherst, Massachusetts, the sum of dollars.”

(1) (Unrestricted)

“To be used for the benefit of the University of Massachusetts in such manner as the Trustees thereof may direct.”

or (2) (Permanent Fund: income unrestricted)

“to constitute an endowment fund to be known as the Fund, such fund to be kept invested by the Trustees of the University of Massachusetts and the income used for the benefit of the College in such manner as the Trustees thereof may direct.”

or (3) (Specific Purposes)

“to be used for the following purposes,”

(Here specify in detail the purposes.)

*Other University of Massachusetts
Catalogues*

- Summer School Catalogue
- Graduate School Catalogue
- Stockbridge School Catalogue

Bulletin

*The University
of Massachusetts*

REPORT OF THE PRESIDENT

to the Board of Trustees, the Governor, and Citizens
of the Commonwealth

JANUARY, 1951 TO JANUARY, 1952



February 15, 1952

The Honorable Joseph W. Bartlett
Chairman, Board of Trustees
The University of Massachusetts

Sir:

I have the honor to present through you to the Board of Trustees for transmission to the Governor of the Commonwealth the annual report of the University of Massachusetts for the year ending January 1, 1952.

Respectfully submitted,

RALPH A. VAN METER, *President*

VOLUME XLIV

APRIL 1952

NUMBER 3

Published five times^v a year by the University of Massachusetts: January, February, April (two), May. Entered at Post Office, Amherst, Mass., as second-class matter.

The report of the President for the year ending January 1, 1952, is part of the 89th annual report of the University of Massachusetts, and as such is Part I of Public Document 31. (Section 8, Chapter 75, of the General Laws of Massachusetts.)

Report Of The President

This year at the University of Massachusetts has been marked by progress in rounding out our organization after the rapid development in the years immediately following World War II. The cold war and the Korean war have been always in the background. Although these are difficult days in which to plan — for universities as well as many other institutions — it is a pleasure to review the University's work of the past year.

The most significant event was the admission of the largest freshman class in our history. A total of 1045 was admitted, of which 639 were men and 406 were women. This class was a fourth larger than the number we could accept the year before, which, in turn, was a third larger than the entering class of the year before.

Another important event of the past year was the establishment of 100 Commonwealth Scholarships of \$250 each, or 25 scholarships for students in each of the University's four undergraduate classes. Permanent doubling of the size of the student body as a result of the post-war building program required a similar doubling of our scholarship funds. The Commonwealth Scholarship idea was suggested to the Recess Commission on Education by members of the University staff in November 1949. It was recommended by the Commission in a report issued March 1, 1950.

Through private gifts over the years the University has accumulated an annual income of between \$20,000 and \$25,000 for scholarship aid to worthy students in need of financial help. These Commonwealth Scholarships therefore have approximately doubled the amount of scholarship aid under the direct administration of the University. A noteworthy aspect is that they are not restricted to men or women students who are studying in particular fields or who are from particular areas of the Commonwealth. Most of our private scholarship gifts have been restrictive.

During the past year, in addition, we have reorganized and enlarged the Graduate School, have obtained the deanship position that will make possible the merger of our separate Schools of Liberal Arts and Sciences into a central College of

Arts and Sciences, have consolidated University publishing functions, and have occupied the new Animal Pathology building.

We have nearly completed Baker dormitory. It will be occupied next September. Because of it, our next academic year will be the first since the end of the war in which we will not have to double freshmen students in dormitory rooms. Next month work is scheduled to start on our new dining hall. It should be ready by a year from next September and will bring our dining facilities into balance with the new enrolment level based on an entering class of 1000 students.

This enrolment level will require important additions to our campus facilities. Foremost among these are a Public Health building, completion of the Engineering building, a Physical Education building for women, enlargement of the Chemistry laboratory and Goodell Library, and a classroom building.

In the undergraduate course we have this year 1046 women and 1969 men, or a total of 3015. In addition we have 308 in the Stockbridge School of Agriculture and 293 in the Graduate School, which bring the total enrollment to 3616. This represents an increase of about 100 over last year. There has been some shift in enrolment. The Schools showing increases are Engineering, Home Economics, Liberal Arts and Business Administration. There are still about 300 student veterans on the campus.

It appears certain that pressure for admission to the University will increase sharply in the latter part of this decade. By 1960 the high birth rate of the early 1940's will result in greatly increased numbers of fully capable young men and women seeking a college education. This wave of increased births is now ten years wide. It has not receded. Last year set a new record for births in the United States. When the increased number of students now in the grade schools is considered along with the increased percentage of high school graduates who seek entrance to college, the resulting figure makes plain that present facilities for higher education are not adequate to meet the insistent demand that is just ahead of us. This time we should be ready.

The increasing demand for education beyond the high school has great significance to the future of the country. More than any other country in the world we cannot leave our welfare in the hands of a small group of men who hold all the power of decision. A democracy must have throughout the population enough intelligent and informed individuals to furnish good leadership at all levels, and a populace that can recognize and will follow good leadership when it appears. Standards of education and the level of information required of the people in this democracy are rising steadily. It is heartening to note that never before in history has a people leaned so heavily on education, expected so much from it, or performed so effectively because of it.

GUIDANCE

Students develop very rapidly in their four years in college. They live, work and play in a scholastic environment designed to bring out their latent possibilities, and to give them well-rounded and effective personalities. The atmosphere is one of learning and development. Much of this growth comes from influences outside the classroom. For although emphasis is placed on academic achievements, no student can devote all his time to class work, and each is encouraged to take part in the varied life of the campus.

This requires some supervision, even though the major responsibility for the direction of the daily program must rest with the student. Freshmen in particular, need guidance in correlating and balancing their interests and their schedules. To give that assistance we have organized an extensive advisory system for them. Each freshman is assigned to some member of the faculty who acts as his adviser and friend. No adviser has more than ten students, since this year about 100 faculty members are serving as freshman advisers. These advisers are sympathetic teachers who assist the student with his personal problems as well as with such problems as proper study habits, budgeting of time, the place of extra-curricular activities, and how to get the most out of the college experience.

To make the advisers more effective this year they were brought together for a series of thirteen lectures and discussions of common problems arranged under the leadership of the Dean's Office with the assistance of the Director of Guid-

ance, the Director of Admissions, the Dean of Men, the Dean of Women, and the Director of Placement.

We now have 833 women students housed in dormitories. In each dormitory a program under the direction of a resident Housemother and trained student leaders is an integral part of the educational and social life of the women students.

When 3600 students, fired by the energy of youth, are brought into close association on a college campus a great increase in extra-curricular activities is only to be expected. The students have nearly 100 clubs devoted to a wide range of interests from stamp collecting to international relations. Faculty advisers are provided whenever they can help. Beyond these, however, is a number of organizations grouped roughly in two divisions: Athletic and Academics activities.

Formation this past year of the Trustee Committee on Student Activities should bring this part of our program to the informed consideration of this governing body. Although extra-curricular activities are important from a recreational standpoint, they also have quite important educational features that are often overlooked. Here students learn to work together toward common ends and to adjust to the interests of others without compromising anything fundamental. Games develop sportsmanship and quick-thinking in emergencies, among other things, and have a definite place in the development of individuals who can live and work effectively. It is only when extra-curricular activities interfere with the academic program that they need to be brought under reasonable control. It is our policy to provide professional supervision to athletic and academics activities. We hope to make the extra-curricular activities as educationally rewarding as possible to the students participating in them, and to see to it that none is harmed by overemphasis on matters of secondary importance.

We have teams representing the University in ten sports. These squads have 523 student enrolments, ranging from 175 in football to 15 in golf. A few students engage in more than one varsity sport, but since this is difficult in these days without serious interference with the academic program it is discouraged.

In intramural sports we have had to limit severely the number of teams and games because of a shortage of basket-

ball floors and football and softball fields. Within that limitation, however, 84 teams played 894 scheduled games involving nearly 1000 students.

Under the direction of the Academic Activities Board are 14 major student organizations, including student bands, singing groups, student publications, and dramatics clubs. These organizations are financed by students through student taxes. They have competent faculty advisers. While the help of adult professional counselors is necessary to a satisfactory program, students are encouraged to accept all the responsibility which they can handle well. Their success is sometimes astonishing.

The programs in Academics have developed greatly in size and in quality in recent years and it sometimes requires close attention to keep them secondary to the academic program in the minds of enthusiastic students.

COLLEGE OF ARTS AND SCIENCES

The University is organized as a central core of Arts and Sciences surrounded by professional Schools. After two years the professional school candidates go on to specialized study. Many of the undergraduates spend their entire four years in Arts and Sciences except for such courses as they may elect in one or more of the professional Schools.

Curriculum-wise this organization has been in effect for some years, but administration has been made cumbersome by the division of Arts and Sciences into two Schools — a division that went back to the days of the agricultural college. During the past year a position has been established which will make it possible to bring the School of Liberal Arts and the School of Science together under one Dean and into one administrative unit. This central College of Arts and Sciences will be formally established next September. A full-time administrator in this area will not only relieve the central administration of the University of much detail but will bring better coordination of fundamental courses and a more smoothly working organization of the whole curriculum.

Liberal Arts has included nine departments. Most of these departments were developed, and developed well, in support of Agriculture when the University was an Agricultural College. When the Agricultural College became a State College

in the early nineteen thirties, the Liberal Arts departments were given a fresh impetus. Under the University organization these departments have continued that growth — the School of Liberal Arts registering the largest enrolment gain of any School during the past year. It has more major students than any other part of the University. Coordination and cooperation between the departments have increased markedly in the past four years.

With the reorganization of the Graduate School last year, the Master of Arts degree was made available. Graduate programs are being developed with the encouragement of scholarship which always accompanies a sound program of graduate work.

Rapid growth of the Liberal Arts departments has brought crowding to a critical state. Office space is scattered and wholly inadequate; classrooms are overcrowded and there is special need for art and music studios.

SCIENCES

The School of Sciences has included eight departments. Our work in science has been well developed and widely known for many years. Three recent publications have emphasized our work in science so strongly that I cannot refrain from mentioning them to you.

The first was a survey of the origins of American Scientists published last May in SCIENCE. The survey covered the 10 year period of 1924 to 1934 and ranked the colleges and universities on the number of graduates per 1000 undergraduates who went on to receive the Ph.D. degree from some graduate school, not necessarily that of their Alma Mater, and who were listed in AMERICAN MEN OF SCIENCE. The University of Massachusetts ranked 5th in the nation and well above all other colleges and universities in New England.

The second was a similar survey, the results of which were published in ENGINEERING AND SCIENCE. It covered the period 1936 to 1946 and in that decade ranked the University of Massachusetts 7th in the nation and, again, well above any other college or university in New England.

The third was a survey the results of which were published by the Office of Scientific Personnel of the National Research

Council. It covered the period 1936 to 1945 and ranked the leading colleges and universities on the total number of graduates in Science who went on to the doctorate regardless of the size of the institution. Here we were handicapped by our comparatively small size. Even so, the University of Massachusetts ranked 30th in a field of 150, outranked in New England only by Harvard, Massachusetts Institute of Technology, and Yale.

Whatever else this means, at least we are inspiring a large number of science students to go on for further study. I have no reason to believe that a similar study of other parts of the University would find a different situation there. In fact, the results of the recent Junior Forestry examinations by the United States Forest Service have just reached the office. Eleven of our Forestry students took these examinations and placed the University of Massachusetts third among the 26 undergraduate schools of forestry in percentage of successful entrants. This is a reflection of general college training, as well as specific training in Forestry.

In part, I believe this is because of the kind of student that comes to the University. Most of them know what it means to work and to earn a part of their own way. In general, they are appreciative of the opportunity offered them by the Commonwealth and plan to make the most of it. They are intelligent and ambitious. They realize that thorough preparation is in these days a necessary prerequisite to maximum success in any profession. Most of our teachers are close to their students and they encourage capable students to keep going. I hope we can continue to teach as successfully in the next 20 years as we have in the 20 years covered by these surveys.

Several acquisitions by the School of Science during the year should be noted. The William Proctor Collection of 5000 species of insects collected on Mt. Desert Island was bequeathed to the University along with a trust fund for its maintenance. This valuable collection increases by about one-third the collection previously available for study and research.

As a legacy from Dr. Guy Chester Crampton, for 36 years one of our most distinguished teachers, the Department of Entomology received his extensive collection of insects as well as his library consisting chiefly of books and papers on insect

morphology. This is one of the most important gifts made to the Department.

The Department of Geology received from Williston Academy of Easthampton a collection of several thousand specimens of minerals, rocks and fossils. Also, Mr. Raymond R. Hibbard of the Buffalo Museum and Mr. Albert Ridwell of the Carter Oil Company have donated several thousand specimens of fossils and minerals. The micropaleontological collection of the Geology Department now ranks among the best in the country.

AGRICULTURE AND HORTICULTURE

The School of Agriculture and Horticulture has a unique position. It is coordinated closely with one of the great industries of the state, and its activities and responsibilities reach to every part of the Commonwealth. Much of its work is supported wholly or in part by Federal funds.

It has a teaching function similar to that of any other School. It has an Experiment Station with an active research program on problems affecting agriculture. It has an Extension Service which gathers information on better methods for farmers, as well as information of value to consumers of farm products, and carries this information to the people of Massachusetts by every means at its command. Finally, it has responsibility for certain Control Services established by law and assigned to the University for execution. It is the only organization of its kind in the Commonwealth.

In my last report I mentioned the consolidation of all these functions in Agriculture and Horticulture under one dean. This work of integration and coordination is proceeding very satisfactorily. The three trustee committees which were formerly related to phases of our Agricultural program have been replaced by one committee. An Agricultural Advisory Committee has been formed. It is composed of a representative from each of the farm commodity organizations, such as Dairy, Fruits, Poultry and Vegetables; and from each of the general farm organizations, such as the Farm Bureau and the Grange. This advisory group will be of great assistance in adjusting our many-sided program to the more important needs of the industry.

Plans are under way to bring under one management all the non-professional employees connected with the University farm, orchards, gardens, and experimental plots. This should mean an increase in efficiency. Also in the planning stage is a project to coordinate more closely the teaching, research, and extension work in Agriculture and to promote a more efficient use of personnel by organizing each departmental program as a joint effort of all the staff rather than through the assignment of individual members to specific activities as a result of certain budget requirements. The carrying out of these plans will strengthen our entire program in Agriculture.

The enrolment in Agriculture continues to be heavy and I believe it will not change significantly. Massachusetts is a small state, yet there are only 14 larger schools of Agriculture in the 48 states. With about 700 students in four-year courses, two-year courses, and the Graduate School, we have more bona fide students in Agriculture today than we had when the University was an Agricultural College.

With every educational tool at its command, including television, the Extension Service continued its efforts to reach and influence an ever-growing number of persons to become better farmers, homemakers, 4-H youths or community citizens. Its program of consumer education is reaching into the cities to round out the food marketing project with factual information of great value to consumers everywhere.

Research findings during the year should result in greater efficiency in the production of several crops. Two new strains of broccoli have been developed which show great promise in commercial production for freezing. It has been found that the use of rock phosphate as a fertilizer for forage crops may result in a more efficient use of phosphates, a saving in sulphur, and greater permanency of pastures. Experiments on the barn drying of hay indicate that it does not result in improved quality, but benefits the farmer primarily in allowing him to produce hay regardless of the weather without fear of fire from spontaneous combustion.

A new technique has been developed for the vaccination of chickens for Newcastle Disease which will reduce the cost and make the procedure less difficult. Some very promising results have been obtained in the control of Dutch Elm Disease

through the selective pruning of elm trees. This may be one of the most important methods of saving special trees. Any other research contributions made this year are reported in eleven Experiment Station bulletins and thirty-seven journal articles.

The Control Services continued to carry out the programs prescribed by law in Feed, Seed, and Fertilizer testing, Dairy Cattle Certification, Poultry Diseases, and Shade Tree Pests. The demand for these services continues to increase each year.

A notable gift to the University during the year was that of 1200 acres of forest land by Mrs. Frank Cadwell. The tract lies on and near Mt. Lincoln a few miles east of Amherst. This brings our forest holdings to about 2000 acres. Together with Mt. Toby Forest it provides splendid laboratory facilities in Forestry and Conservation.

BUSINESS ADMINISTRATION

The School of Business Administration continues to display the driving energy that has carried it forward steadily since its inception some five years ago. In the past year the School has improved its curriculum, strengthened its staff, and extended its contact with the people of the Commonwealth. It is prepared to present a small graduate program for which there is an active demand.

A new merchandizing program was begun in cooperation with the School of Home Economics to train students for small business in the merchandizing field, particularly dress shops and restaurants. There was also introduced a course in Budgetary Accounting to improve offerings for those training to be business accountants rather than certified public accountants.

The School has developed a fine relationship with the Pioneer Valley Association. This is a regional promotion organization. It has a special interest in business and industry, and its operating committees involve some of the outstanding men in this Connecticut River Valley section.

School contacts with the region are by no means confined to the Pioneer Valley Association, but the Association does furnish an important field for extended cooperation. The Association needs numerous business and industrial studies and surveys. These afford splendid opportunities for exper-

ience on the part of advanced students under the skilled direction of staff members. Results are disseminated rapidly and used effectively by the Association. Several studies have been published. Others are in progress.

The School has had an acting dean who was also head of the Department of Economics. The University is indebted to him for a tremendous amount of extra work that he has done in building this School while we lacked the deanship position. This has been established recently. We plan now to separate Economics from Business Administration. We shall have a strong Department of Economics in the College of Arts and Sciences with other subjects basic to the core curriculum. However, there must always be close cooperation between Economics and Business Administration.

There is reason to believe that the School of Business Administration will continue to fill a more and more important place in the University. The enrolment is increasing. The staff is able and intensely interested in developing a well-rounded organization. The School is badly housed, and we must try soon to find more adequate space for offices, classrooms, and laboratories.

ENGINEERING

The School of Engineering was established by the Trustees in September 1947. In two years the number of students reached 580. In 1950 we graduated 231 engineers, most of them veterans. As in other parts of the University, the large group of veterans threw enrolment in the four classes out of line, but the classes are filling rapidly. The entering class of Engineering students last September numbered 156 and was double the freshman enrolment of the preceding year. The total enrolment was approximately 400.

It is highly probable that the School of Engineering will continue to develop rapidly. When the Main Engineering Building is completed we shall have facilities of which any School of Engineering would be proud. Instruction in Civil Engineering was accredited in 1949 and that in Electrical, Mechanical and Industrial Engineering in 1950 by the Engineers Council for Professional Development. All were the result of first inspections.

Equipment in Engineering is good but there are gaps that we are filling as rapidly as we can. At the start we obtained some \$200,000 worth of war surplus equipment which was adapted to the teaching program. Many necessary items were not available as war surplus, however.

HOME ECONOMICS

The number of undergraduates enrolled as Home Economics majors continues to grow, with 282 students this year compared with 241 last year. In addition more than 60 non-major undergraduate students were enrolled in Home Economics courses. Half of these were men, as Home Economics continues to serve advanced students from other Schools in such fields as Nutrition. There are four graduate students in Home Economics, and 22 graduate students from other Schools are taking courses there.

The staff of the School was increased by two new instructors in September, making a total of 12 teachers. The teaching load is heavy and laboratory facilities which seemed generous two years ago are crowded to capacity every day of the week.

The Homestead practice house which had been almost destroyed by termites, has been rebuilt and completely renovated. Since November it has been reoccupied. The Home Management Apartment at the new University Apartment House was used last year while the Homestead was being renovated. Both units are now in constant use because of the growth of the School.

DIVISION OF PHYSICAL EDUCATION

The Division of Physical Education includes the Departments of Athletics, Physical Education for Men, and Physical Education for Women. Our sports program has already been mentioned. An earnest effort is made to involve as many students as possible in Athletics and supervised sports. The success of the program is often embarrassing in that facilities fall far short of the demand.

The success of college athletic teams is of absorbing interest to many people from whom the academic program receives scant attention. They exert in various ways a pressure toward overemphasis on athletics that sometimes leads to excesses

that make headlines in the daily papers. But the greatest damage that is done is less spectacular. It is the denial of a real educational development to thousands of boys who are exploited because of their athletic prowess to the point where athletics absorb too much of their time in college. We need a more sane perspective on this matter of winning games.

It is clear that over a period of years a team should win about half its games. Sometimes when circumstances are favorable the team may crush all opposition and in other years it might lose most of its games but if, over the years, it continues to win most of its games it is taking somehow a systematic advantage over its opponents. If the team loses most of its games over a long period it is playing out of its class. The team that loses sometimes deserves more credit than the team that wins.

Important to *all* students is the required physical fitness program. It is an attempt to help each student to develop and maintain a reasonable minimum standard of physical fitness. Every freshman must meet a physical fitness rating and learn to swim. Professional assistance is given in correcting deficiencies and individual attention is given to those who need it through the freshman and sophomore years.

We have made substantial additions in the field of heavy apparatus that have increased the effectiveness of the physical fitness program. This form of exercise appeals to students who have little interest in team sports. Another development is a group of professional courses in safety education for instructors. These courses cover such matters as First Aid, Driver Education, Water Safety, and the prevention and care of injuries in athletic contests.

DIVISION OF MILITARY SCIENCE AND TACTICS

The Division of Military Science and Tactics is responsible for the Reserve Officers Training Corps. It includes two departments: Armor and Air Force.

All able-bodied men undergraduates are required to take the basic two years of Military Science and Tactics. Selected students may enroll for advanced courses in the junior and senior years, at the end of which they are commissioned in the organized reserve. Honor graduates are offered commissions in the Regular Army or Air Force.

The Military courses have been reorganized, modernized and expanded to meet the present needs of national defense. Fifteen officer instructors and 13 enlisted men provide the

instruction and maintain the laboratory material. Most of them are combat trained. A new garage for housing our five tanks was occupied in September.

The Military Division is well manned and effective. It is closely coordinated with the rest of our program and its needs for more classrooms represent a part of our general problem in rounding out our post-war development. We hope that the Federal defense forces can be prevailed upon to build an Armory on the campus sometime soon.

THE GRADUATE SCHOOL

Thirty departments offer graduate courses. The enrollment in the Graduate School has been approximately 300 for several years. Near the end of last year we started a reorganization of the Graduate School which is still under way.

In the past year the Graduate Council has made a thorough study of the graduate program. As a result of this study a number of important changes were recommended to the President, voted by the Faculty and approved by the Trustees. These included the clarification and establishment of new standards of admission; the formulation of a number of policies designed to emphasize high scholarship; a thorough revision of the curriculum; new procedures for allocating Teaching Fellows to departments; and a general clarification and standardization of requirements for advanced degrees. These changes will strengthen materially a School that has contributed much to our program in past years.

Even modest graduate and research programs have a very stimulating effect on a teaching department and we are gradually extending these functions to new departments. We need more Teaching and Research Fellows to relieve teachers of routine work in critical cases and free them for closer supervision of graduate students. This is the most efficient way to use funds available for instruction.

In general, the University today is in a healthy condition. Our troubles are mostly growing pains: much has been accomplished in the past year; much remains to be done. Although development in the next few years will not be so rapid as in the years immediately following World War II, this past year should be typical of the next few years in that we have entered a period of steady growth.

RALPH A. VAN METER
President

February 15, 1952

UNIVERSITY OF MASSACHUSETTS ENROLLMENT

OCTOBER 1951

UNDERGRADUATE COLLEGE

Class..... SCHOOL	1952		1953		1954		1955		Total		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
Liberal Arts	77	57	109	84	71	130	112	209	369	480	849
Science	74	29	104	38	105	64	137	82	420	203	623
Engineering	94	0	64	1	76	0	156	1	390	2	392
Business Administration	62	3	66	8	100	12	123	7	351	30	381
Agriculture and Horticulture	89	3	69	11	103	6	87	4	348	24	372
Home Economics	0	45	0	57	0	77	0	103	0	282	282
Division of Physical Education for Men	4	0	14	0	14	0	24	0	56	0	56
Specials									35	25	60
Totals	400	137	426	199	469	279	639	406	1969	1046	3015

GRADUATE SCHOOL

Men	Women	Total
264	29	293

STOCKBRIDGE SCHOOL

Class... 1952			1953		Total
	Men	Women	Men	Women	
	138	2	165	3	308

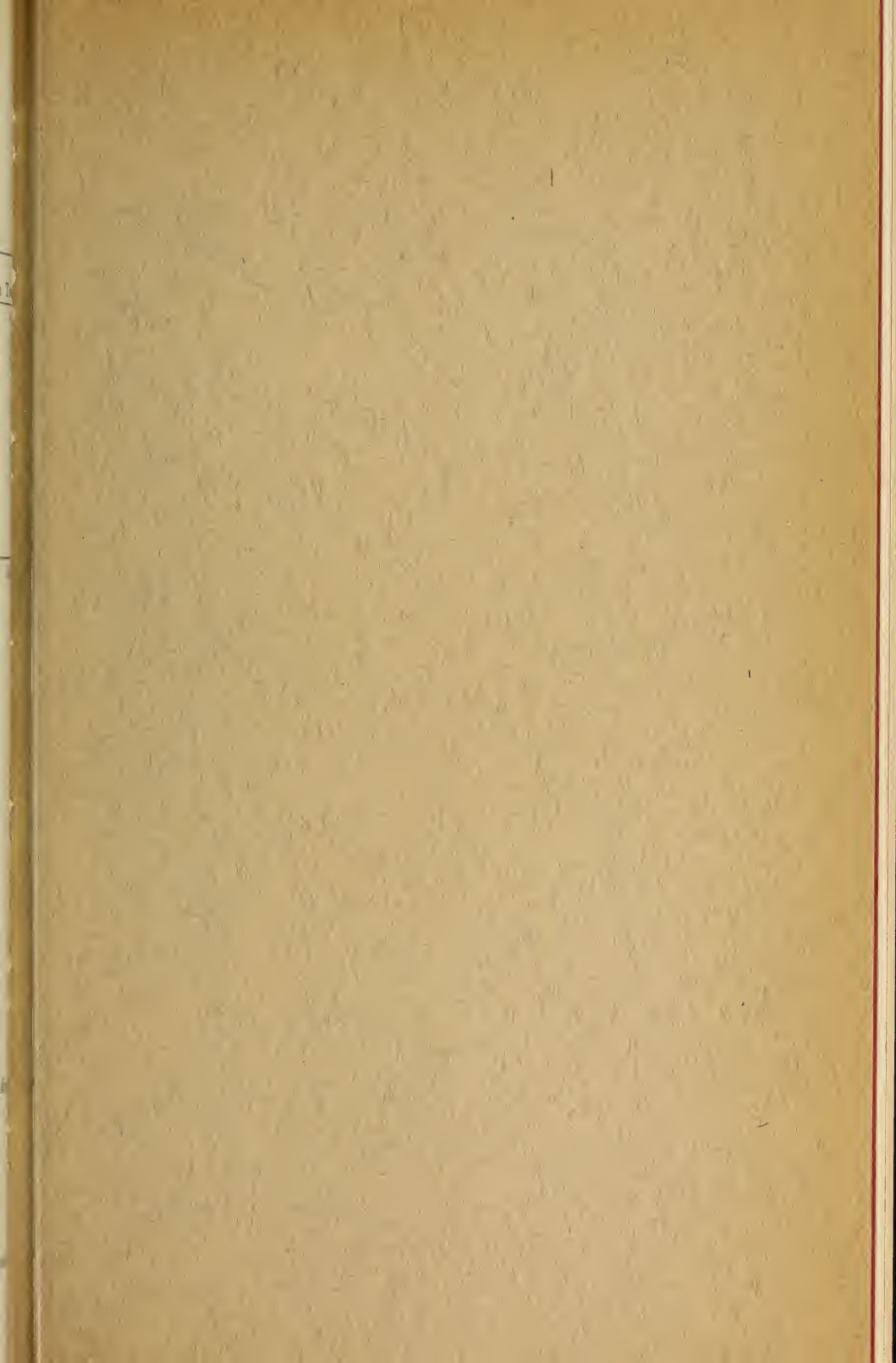
SUMMER SCHOOL 1951

Men	Women	Total
483	133	616

SUMMARY

	Total
Undergraduate College.....	3015
Graduate School.....	293
Stockbridge School.....	308
	3616 Total Enrollment

(Office of Publications, October 1951)



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Association

**UNIVERSITY OF MASSACHUSETTS
SUMMER SESSION
1952**

July 1 — August 13

The University of Massachusetts will conduct a six-week Summer Session in 1952. A wide variety of basic courses in many fields will be offered, along with special advanced courses to meet the needs of graduate and undergraduate students, veterans, teachers, school officials and persons interested in pursuing college work for self-improvement, regardless of college credit.

Workshop courses in Recreational Leadership, French and German will be offered for the first time. The Seminar for School Administrators is also a new offering.

LOCATION

The University of Massachusetts is located in Amherst, near the geographical center of the State. This town of 7,000 inhabitants overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted for its scenic beauty and its educational institutions. The University has a winter enrollment of 3600 and its 700-acre campus contains 50 major buildings and a library of 176,000 volumes.

DEGREE CREDIT

All courses offered carry degree credit. They are organized on a one-semester basis, and are equivalent in method, content and credit to courses offered in the University during the regular academic year. Credits obtained in these courses are ordinarily accepted as transfer credits by other colleges and universities. Students attending the Summer Session may earn not more than six semester hours of credit toward graduate or undergraduate degrees, except in cases where the Dean grants special permission to carry excess credits.

EXPENSES

1. Tuition for residents of Massachusetts (entire session)	\$20.00
2. Tuition for non-resident undergraduate students (entire session)	\$80.00
3. Tuition for non-resident graduate students per semester credit hour	\$7.50
4. Student Health and Activities Fee	\$2.00
5. Room rent for six weeks at \$4.00 per week	\$24.00
6. Board for six weeks (Monday through Friday) at \$9.50 per week	\$57.00

Payment for Summer Session fees is due June 23 and must be paid at or before registration. No students will be eligible to attend classes until fees are paid,

ROOMS AND BOARD

Students, not commuting from home, are expected to live in University Dormitories and board at the University Dining Halls.

ADVANCE ENROLLMENT; VETERANS AND CIVILIANS

In order to facilitate arrangements, students contemplating attendance should notify the Dean at once using the application form on page 13.

Veterans who plan to enroll under the G.I. Bill must present at the time of registration evidence of eligibility (V. A. certificate of eligibility or, if previously enrolled, a clearance through the University Coordinator). Veterans failing to obtain certification must make payment of tuition and fees.

New students who are not under G.I. Bills must file certificate of residence with the Treasurer's Office.

HEALTH AND RECREATION

The University Infirmary will be kept open during the session with a staff doctor on call.

Under the direction of a faculty-student committee, programs for recreation offering many informal sports such as swimming, soft ball, baseball, tennis and hiking will be arranged.

A limited number of special lectures and entertainments will also be provided. Dances and one major picnic will be scheduled by the Social Committee.

CALENDAR

July 1 — 9:00 a. m. — 12:00 M	}	Registration, Drill Hall
2:00 p. m. — 3:30 p. m		

July 2 — 8:00 a. m. Classes begin.

July 4, Friday. No college exercises. Classes normally scheduled for this day will be held Saturday, July 5.

August 12, 13. Final examinations.

August 13 — 12:00 M. End of Summer Session.

LIST OF COURSES

The following courses will be offered in accordance with the schedule indicated. In general, courses numbered 50 or above are acceptable for graduate credit. The University reserves the right to withdraw any course in which less than eight students are enrolled.

	<i>Credit</i>
AGRICULTURAL ECONOMICS 79. Principles and Methods of Statistics. Methods of collecting, analyzing, interpreting, and presenting statistical data. 2-4:50 MTWTF, North College, 411.	3
ACCOUNTING 25. PRINCIPLES OF BUSINESS ACCOUNTING. The principles underlying the accounting system in the gathering, analysis, and interpretation of accounting data. 2-4:50 MTWTF, North College, 406.	3
BOTANY 1. INTRODUCTORY BOTANY. The morphology and physiology of plants. 2-2:50 MTWTF, Clark Hall, 104; 3-4:50 MTWT, Clark Hall, 202.	3
BUSINESS LAW 70. The drawing, reading and interpretation of contracts and sales; wills, commercial paper, carriers, real estate agency, public and personal rights. 11:20-12:50 MTWTF, Goessmann, 26.	3
CHEMISTRY 29. QUALITATIVE ANALYSIS. A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. 1-4:50 MTWTF, Goessmann 28 and 7. Prerequisite, Chemistry 2, General.	4
CHEMISTRY 30. QUANTITATIVE ANALYSIS. The theory and practice of representative determinations, both gravimetric and volumetric. 8-11:50 MTWTF, Goessmann 28 and 228. Prerequisite, Chemistry 29, Qualitative Analysis.	4
CHEMISTRY 51. ORGANIC CHEMISTRY. Theory of organic chemistry. Deals largely with compounds of aliphatic series. 9:40-11:10 MTWTF, Goessmann, 28; 1-4:50 TT, Goessmann, 112. Prerequisite, Chemistry 29.	4
DAIRY INDUSTRY 78. ICE CREAM MAKING. A study of the principles and practices of ice cream making with some time devoted to refrigeration, machinery, delivery equipment, and merchandising methods. 8-11:50 MTWTF, Flint Laboratory.	4
ECONOMICS 25. ELEMENTS OF ECONOMICS. Definitions and introductory principles of production, exchange, and the financial organization of society; the economics of distribution and the use of wealth and income. 11:20-12:50 MTWTF, Goessmann 28.	3
ECONOMICS 91. SEMINAR. Economics of War. 8-9:30 MTWTF, Goessmann, 26.	3
EDUCATION 153. TESTS AND MEASUREMENTS. Construction, administration, scoring and interpretation of results of educational tests. 11:20-12:50 MTWTF, Liberal Arts Annex, 32.	3

- EDUCATION 160. ELEMENTARY SCHOOL CURRICULUM. Content and methodology with emphasis on the unit method and activity program. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 12A.
- EDUCATION 161. ELEMENTARY READING AND LANGUAGE ARTS. Purposes, methods and materials of oral and written language and reading. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 12A.
- EDUCATION 162. ELEMENTARY ARITHMETIC AND SCIENCE. Methods and materials and their place in the activity program. 3
8-9:30 MTWTF, Liberal Arts Annex, 12.
- EDUCATION 163. PRINCIPLES OF ELEMENTARY EDUCATION. Aims, organization, program, and pupil population. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 12.
- EDUCATION 166. AUDIO-VISUAL AIDS IN EDUCATION. A study of a variety of aids and how they may be used effectively in teaching. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 32.
- EDUCATION 267. AUDIO-VISUAL LABORATORY. A second course dealing with operation, care and minor repair of a wide variety of equipment, including projectors, recorders, and radios. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 30.
- ENGLISH 2. COMPOSITION. Intended to teach straight thinking, sound structure, clear and correct expression. 2
11:20-12:10 MTWTF, Old Chapel, B.
- ENGLISH 25. HUMANE LETTERS. A general reading course based upon a chronological selection of masterpieces, both classical and English. 3
8-9:30 MTWTF, Old Chapel, B.
- ENGLISH 63. AMERICAN POETRY. A study of American poetry from Colonial times to 1900, with special emphasis upon the work of Freneau, Bryant, Emerson, Longfellow, Whittier, Poe, Whitman, and Emily Dickinson. 3
9:40-11:10 MTWTF, Old Chapel, B.
- ENGLISH 73. The Novel from Defoe through the Victorians. The development of the novel: reading and discussion of great English novels of the eighteenth and nineteenth centuries. 3
11:20-12:50 MTWTF, Old Chapel, C.
- FOOD TECHNOLOGY 51. INTRODUCTORY COURSE. A general elementary course covering food economics, production, distribution and processing. 3
1-5 MWF, Chenoweth Laboratory.
- FOOD TECHNOLOGY 61. INDUSTRIAL TECHNOLOGY. A survey of commercial practices in the manufacture and preservation of food products. 3
1-5 MWF, Chenoweth Laboratory
Prerequisites, Food Technology 51 and 52; Bacteriology 31, Introductory.

- WORKSHOP IN FRENCH.** Designed especially for the in-service teacher but others may enroll with the consent of the instructor. Individual needs will be carefully considered and laboratory techniques stressed. Attention will be given to newer methods and to recent developments in audio-visual aids. Pronunciation, diction, intonation, grammar, and stylistics will be among the approaches to an increased knowledge of French. 3
8-9:30 MTWTF, Liberal Arts Annex, 8.
- GEOLOGY 27. PHYSICAL GEOLOGY.** Agents and processes that modify the earth's crust. 3
8-11 MTWTF, Fernald Hall, K and B.
- GERMAN 25. INTERMEDIATE GERMAN.** German prose and poetry; grammar review and advanced prose composition. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 1.
Prerequisites, German 1 and 2.
- WORKSHOP IN GERMAN.** For graduate students. An intensive course designed to provide the student with the elements of German needed for acquiring a reading knowledge of the language. Study of the basic principles of grammar and sentence structure. Reading and translation of scientific and literary texts. 3
8-9:30 MTWTF, Liberal Arts Annex, 1.
- GOVERNMENT 25. AMERICAN GOVERNMENT.** Structure and operation of our federal government. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 27.
- HISTORY 6. MODERN EUROPEAN CIVILIZATION.** The course covers the period from 1815 to the present. 3
9:40-11:10 MTWTF, Goessmann, 26.
- HISTORY 60. HISTORY OF THE UNITED STATES.** A survey of the national development of American democracy from 1865 to the present. 3
8-9:30 MTWTF, Old Chapel, C.
- HISTORY 70. EUROPE SINCE 1918.** Approximately half of the course is devoted to international affairs, the other half to a study of internal developments in the principal European countries. 3
9:40-11:10 MTWTF, Old Chapel, C.
- HOME ECONOMICS 70. CHILD DEVELOPMENT.** The growth and development of the child, his basic needs, aspects and behavior, as they are related to personality development. 3
9:40-11:10 MTWTF, Skinner Hall, 217.
- HOME ECONOMICS 77. HOME MANAGEMENT PRACTICE.** In the home management house students assume the responsibilities involved in managing a home. 3
Hours by arrangement.
- HOME ECONOMICS 81. METHODS OF TEACHING HOME ECONOMICS.** This course gives credit toward meeting state standards for teachers. 3
8-9:30 MTWTF, Skinner Hall, 217.

- HOME ECONOMICS 98. SPECIAL PROBLEMS. Weaving and other problems of textiles. 3
8-9:30 MTWTF, Skinner Hall, 119.
- INDUSTRIAL ADMINISTRATION 83. BUSINESS MANAGEMENT. A study of the problems connected with the management of a business enterprise. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 12.
- MARKETING 53. MARKETING AND MARKETING PROBLEMS. A study of the forces and conditions which determine prices and the mechanism methods, and problems concerned with transporting, storing and distributing economic goods. 3
8-9:30 MTWTF, Liberal Arts Annex, 12A.
- MATHEMATICS 6. INTRODUCTORY CALCULUS FOR ENGINEERS. Differentiation, with applications, technique of integration. 4
9-11 MTWTF, Mathematics Building, B.
Prerequisite, Mathematics 5 (Trigonometry and Algebra).
- MATHEMATICS 7. ALGEBRA AND TRIGONOMETRY. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry. 3
8-9:30 MTWTF, Mathematics Building, G.
- MATHEMATICS 51. MODERN SYNTHETIC GEOMETRY. An extension of the geometry of the triangle and the circle. 3
9:40-11:10 MTWTF, Mathematics Building, G.
Prerequisite, Mathematics 30 (Integral Calculus).
- MATHEMATICS 91. INTERMEDIATE CALCULUS. Series, expansion of functions, partial differentiation, envelopes, and multiple integrals. 3
11:20-12:50 MTWTF, Mathematics Building, B.
Prerequisite, Mathematics 30 (Integral Calculus).
- MILITARY 26. (Air) The second half of the second year course in Air Science and Tactics. 2
9:40-11:10 MTWTF, Liberal Arts Annex, 15.
- MUSIC 62. TEACHING OF MUSIC IN THE ELEMENTARY GRADES. The principles of musical development are studied with particular emphasis on presentation in the classroom. 3
8-9:30 MTWTF, Memorial Hall.
- PHILOSOPHY 62. HISTORY OF PHILOSOPHY. The development of western thought from the early Greeks to the present. 3
8-9:30 MTWTF, Liberal Arts Annex, 11A.
- PHILOSOPHY 81. PHILOSOPHY OF RELIGION. A critical and constructive study of the origin and nature of religion. 3
9:40-11:10 MTWTF, Liberal Arts Annex, 11A.
- PSYCHOLOGY 26. GENERAL PSYCHOLOGY. An introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. 3
11:20-12:50 MTWTF, Liberal Arts Annex, 27.

- PSYCHOLOGY 88. PSYCHOLOGY OF GUIDANCE. A study of the psychological principles, techniques and tests necessary in guidance. 3
8-9:30 MTWTF, Liberal Arts Annex, 27.
Prerequisites, Psychology 26 (General) and 81 (Psychological Tests).
- SOCIOLOGY 28. INTRODUCTION TO SOCIOLOGY. An outline of the social order, and the individual considered as a member of his various groups. 3
8-9:30 MTWTF, Old Chapel, D.
- SOCIOLOGY 54. AMERICAN RACE RELATIONS. The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. 3
9:40-11:10 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28.
- SOCIOLOGY 57. THE FAMILY. The history and development of the customs of courtship and marriage from primitive society to the American family. 3
11:20-12:50 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28.
- SOCIOLOGY 75. SOCIAL PROBLEMS. A study of abuses affecting the home, recreation, industry, welfare, public health, government. 3
1-2:30 MTWTF, Old Chapel, D.
Prerequisite, Sociology 28.
- SPEECH 89. DRAMATIC PRODUCTION. Instruction and practice in casting, directing, make-up, lighting, and scenic design and construction. 3
2-4:30 MTWTF, Old Chapel Auditorium.
- SPEECH 91. EXTEMPORE SPEECH. Theory and practice of public speaking for business and professional purposes. 3
9:40-11:10 MTWTF, Old Chapel Auditorium.

SPECIAL COURSES

- CIVIL ENGINEERING 27. PLANE SURVEYING. The basic principles of mensuration; use of tape, transit, and level; a brief consideration of route surveying. Credit, 3.
3 44-hour weeks: September 2-20.
Engineering Building. MR. GABRYS.
Prerequisite, Mathematics 5, Introductory Engineering Mathematics, or Mathematics 7, Algebra and Trigonometry.
Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.
- CIVIL ENGINEERING 28. PROPERTY AND TOPOGRAPHIC SURVEYING. A transit and tape property survey requiring reference to Registry of Deeds records. Credit, 3.
3 44-hour weeks: June 2-21 or June 23-July 12.
Engineering Building. MR. HENDRICKSON.
Prerequisite, Civil Engineering 25, Surveying, or Civil Engineering 27.
Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

CIVIL ENGINEERING 30. ROUTE SURVEYING PRACTICE. A preliminary survey for a short highway location and the preparation of maps and profile. Credit, 3.

3 44-hour weeks: June 2-21 or June 23-July 12.

Engineering Building.

MR. OSGOOD.

Prerequisite, Civil Engineering 25, Surveying, or Civil Engineering 27.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 23. SHOP. Woodworking, pattern making, and welding; use of various machine and hand tools used in metal working. Credit, 3.

3 44-hour weeks: August 11-30.

Engineering Shop.

MR. PATTERSON, MR. PUSHEE.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 27. SHOP. Woodworking and pattern making; welding. For mechanical engineering majors. Credit, 3.

3 44-hour weeks: June 2-21 or June 23-July 12.

Engineering Shop.

MR. PUSHEE.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools: lathe, planer, shaper, milling machine and drill press. Credit, 3.

3 44-hour weeks: June 2-21 or June 23-July 12.

Engineering Shop.

MR. PATTERSON.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

FORESTRY 55. THE ELEMENTS OF FOREST MENSURATION. Methods of determining the volume and value of the forest growing stock; type mapping; methods of predicting growth of trees and stands. Credit, 3.

3 44-hour weeks: June 2-21.

Conservation Building.

MR. MACCONNELL.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

FORESTRY 78. HARVESTING OF FOREST PRODUCTS. Methods of harvesting in the several forest regions of the United States. Cost control as a factor in the development of methods and policies. Credit, 3.

3 44-hour weeks: June 23-July 12.

Conservation Building.

MR. GANLEY.

Tuition fee for Massachusetts residents \$15.00; for non-residents \$60.00.

PUBLIC HEALTH 205. SUPERVISED FIELD TRAINING. All graduates majoring in sanitary technology must complete a prescribed twelve-week field training program conducted by the New England Field Training Center under direction of the Training Division of the Communicable Disease Center, U. S. Public Health Service, with the assistance of the State Department of Health personnel. The course is a prerequisite for placement in federal, state, and municipal agencies. Credit, 6.
June 2-August 23.

Marshall Hall.

THE DEPARTMENT.

Tuition fee for Massachusetts residents \$30.00; for non-residents \$120.00.

COMMUNITY RECREATION. A workshop course in Leadership Problems. Planned for in-service teachers, social agency leaders, majors in recreation, and other professional workers whose responsibilities include the field of community recreation. Among the problems for study are: the responsibility of recreation in social planning, interpreting the purposes of functional recreation to the layman, problems in planning and conducting rural and urban community programs, coordinating the services of youth agencies.

Field Trips.

Credit, 3.

July 1- August 13. 8-9:30 MTWTF, Skinner Hall, 4. MR. GRIMSHAW, in cooperation with prominent visiting discussion leaders.

ARTS AND CRAFTS. This course will give practical arts and crafts training in the history, philosophy, program planning, methods of presentation, design, and the following twenty craft projects suited to various age levels:

Sawdust Modeling	Marbleized Decoration
Finger Painting	Musical Instruments
Bookbinding	Two Harness Weaving
Paper Mache	Egyptian Card Weaving
Mask Making	Felt Printing
Spatter Printing	Tin Can Work
Photo Blue Printing	Stencilling on Metal and Cloth
Tie Dyeing	Simple Jewelry
Candle Making	Braiding and Knotting
Tricks and Games	Knot Weaving

The course will be given by the Director of Arts and Crafts of the National Recreation Association.

Credit, 2.

July 7-19. Lecture hours 9:40-11:10 MTWTF; laboratory hours 1-5 MTWTF.

Skinner Hall, 4.

DR. STAPLES.

Non-credit students may take either the lectures or the laboratory work or both.

Tuition fee for Massachusetts residents \$10.00; for non-residents \$40.00

SEMINAR FOR SCHOOL ADMINISTRATORS. For school superintendents. The plan is to utilize a combination of small study groups with frequent reports to the whole group on problems chosen by the administrators. Any administrator who plans to attend is asked to write Dr. A. W. Purvis as soon as possible in order that a check-list of possible problems may be circulated before the seminar begins.

Credit, 2.

July 7-25. 8:30-10:30 MTWTF.

Liberal Arts Annex, 30.

THE EDUCATION DEPARTMENT.

Tuition fee for Massachusetts residents \$10.00; for non-residents \$40.00

WORKSHOP IN AUDIO-VISUAL EDUCATION. For teachers or college graduates expecting to teach. The purpose of the workshop is to acquaint teachers with A-V equipment and its operation, and with available A-V materials, and to show how audio-visual aids can be integrated with the curriculum. The whole group will meet for two hours each morning for lecture demonstrations. Groups of 15-20 interested in the same grade level or subject matter area will meet for discussion and study each morning for two hours and in the afternoon for two hours of laboratory work on the machines. At optional evening meetings many films and filmstrips will be projected to acquaint people with current materials. For further details as to fees and course content address Mr. Kelsey Sweatt, State Department of Education, University Extension, 200 Newbury St., Boston, 16, Massachusetts.

June 25, 26, 27. Credit, 1 semester hour through University Extension.

Liberal Arts Annex, 32.

MR. SWEATT, MR. WYMAN.

APPLICATION FOR ADMISSION

Prospective students may use the form below in applying for admission to the 1952 Summer Session. This should be sent to The Dean, University of Massachusetts, Amherst, Mass.

UNIVERSITY OF MASSACHUSETTS

1952 Summer Session

NAME

ADDRESS

.....

COURSES:

Name and No.

Descriptive Title

.....

.....

I am a graduate of.....

and received my degree inon.....19

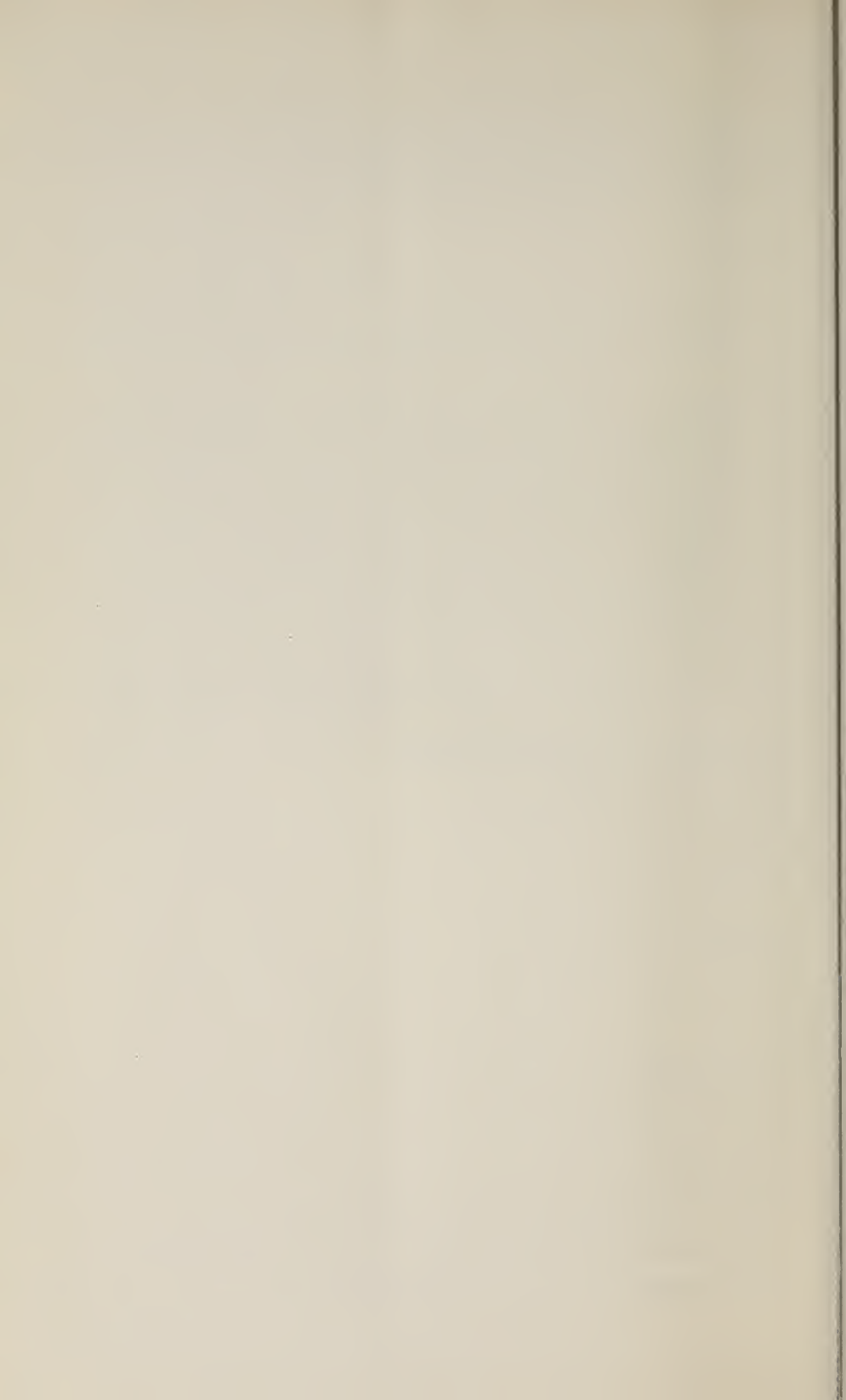
I am a college student at

in the Class of 19.....

Will you be studying under the G.I. Bill?

I will need a room in the dormitory (please check)

I will commute (please check)





*Other University of Massachusetts
Catalogues:*

- Undergraduate Catalogue
- Graduate School Catalogue
- Stockbridge School Catalogue

Bulletin

UNIVERSITY OF
MASSACHUSETTS

COMMENCEMENT

1952





PRESIDENT'S LETTER

TO ALL ALUMNI AND FRIENDS OF THE UNIVERSITY OF MASSACHUSETTS.

This is a cordial invitation to all of you to attend our Eighty-Second Commencement.

Commencement is not for the graduating class alone. If you belong to one of the classes scheduled for reunion this year you can hardly afford to miss this chance to spend a few hours with those you knew so well in the golden days. The weekend offers to others interested a splendid opportunity to renew friendships and contacts with the University.

Marked changes have come to the campus in recent years and more changes will come as we develop further, but the old landmarks are still here and you will feel quite at home. New buildings and new courses attest the vigor and vitality of the University and the essential soundness and adaptability of the program that has been developed through the years. We can all feel a profound satisfaction that the University of Massachusetts has come much closer to meeting the challenge and responsibility of a State University in Massachusetts.

We should be delighted to have you join us at Commencement time.

Sincerely,

R. A. VAN METER,
President.

PROGRAM



FRIDAY, MAY 30, 1952

8:00 P.M. Informal Class Reunions.

9:00 P.M. Sophomore-Senior Hop.

SATURDAY, MAY 31, ALUMNI-CLASS DAY

10:00 A.M. Annual Meeting, Associate Alumni, Memorial Hall.

10:30 A.M. Semi-Annual Meeting, Board of Trustees, President's Office.

12:00 M. Alumni Clambake, Drill Hall.

2:00 P.M. Alumni Parade to Ball Game.

2:30 P.M. Varsity Baseball Game with Amherst College, Alumni Field. Following Game — Half Hour Concert on Chime.

6:00 P.M. Fraternity and Class Reunions as arranged by organizations.

7:15 P.M. Senior Class Night Exercises, Goodell Library Lawn.
(In case of rain, the Cage).

9:00 P.M. Roister Doister Play, "Eastward in Eden" — The story of Emily Dickinson.

SUNDAY, JUNE 1, COMMENCEMENT

9:00 A.M. Academics and Varsity Club Breakfast Meetings, Draper Hall.

11:00 A.M. Baccalaureate Service, the Cage.
Speaker: Paul Scherer, D.D., LL.D., L.H.D.
Brown Professor of Homiletics
Union Theological Seminary

12:00 M. Fraternity and Class Reunions as arranged by organizations.

3:00 P.M. Academic Procession from Memorial Hall.

3:30 P.M. Graduation Exercises.
Speaker to be announced.

ALUMNI REUNION PROGRAM

SATURDAY, MAY 31

- 10:00 A.M. Annual Meeting of the Associate Alumni, Auditorium, Memorial Hall.
- 12:00 Noon Annual Alumni Clambake, Drill Hall
Alternative luncheon, Draper Hall.
- 2:00 P.M. Alumni Parade, Memorial Hall to Alumni Field.
- 2:30 P.M. Varsity Baseball Game — with Amherst College, Alumni Field. Following the game there will be a half-hour concert on the college chime.
- 6:00 P.M. Class and fraternity reunions and suppers as arranged by the various organizations.
- 9:00 P.M. Roister Doister Play — "Eastward in Eden," Bowker Auditorium.

CLASS REUNIONS

ALUMNI REGISTRATION HEADQUARTERS, MEMORIAL HALL

- 1887 65th Reunion—Clinton S. Howe, West Medway, Mass.
- 1892 60th Reunion—Dr. Milton H. Williams, Sunderland, Mass.
- 1894 Annual Reunion—Dr. S. Francis Howard, 58 Main Street, P. O. Box 94, Northfield, Vermont
- 1897 55th Reunion—Dr. Charles A. Peters, 16 So. Sunset Avenue, Amherst, Mass.
- 1902 50th Reunion—Howard Lawton Knight, R.F.D., Route 5, Westminster, Md.
- 1903 Annual Reunion—Gerald D. Jones, Cowles Farm, North Amherst, Mass.
- 1907 45th Reunion—Edward H. Shaw, 215 Washington St., Belmont, Mass.
- 1911 Annual Reunion—Leonard M. Johnson, P. O. Box 583, Danbury, Conn.
- 1912 40th Reunion—Frank B. Hills, 90 Broad Street, New York, N. Y.
- 1916 Annual Reunion—Conrad H. Lieber, Spring Lane, East Pembroke, Mass.
- 1917 35th Reunion—Richard W. Smith, 205 Church Street, New Haven, Conn.
- 1922 30th Reunion—Clarence F. Clark, Main St., Sunderland, Mass.
- 1927 25th Reunion—Clarence H. Parsons, Stockbridge Hall, University of Massachusetts
- 1932 20th Reunion—Margaret Boston Cruickshank, 6 Morningside Road, Needham, Mass.
- 1937 15th Reunion—David P. Rossiter, Jr., 1 Upland Road, Marblehead, Mass.
- 1942 10th Reunion—Dr. William J. Dwyer, Worcester City Hospital, Worcester, Mass.
- 1947 5th Reunion—Gordon P. Smith, 67-90A 223rd Place, Bayside, L. I., N. Y.
- 1949 3rd Reunion—Wallace J. Kallaughner, 7 Wilson St., Leominster, Mass.
- 1951 1st Reunion—Lt. Richard L. Boynton, 8 Hyde St., Brookfield, Mass.



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